

EDUCATING COASTAL MANAGERS

PROCEEDINGS OF THE RHODE ISLAND WORKSHOP

March 4-10, 1995
W. Alton Jones Campus
University of Rhode Island

Editors
Brian R. Crawford
J. Stanley Cobb
Chou Loke Ming

Coastal Resources Management Project

Coastal Resources Center
University of Rhode Island

Bureau for Global Programs, Field Support and Research
Center for the Environment and Natural Resources
U.S. Agency for International Development



March 4-10, 1995
W. Alton Jones Campus
The University of Rhode Island

Editors

Brian R. Crawford
J. Stanley Cobb
Chou Loke Ming

Published by the Coastal Resources Management Project,
Coastal Resources Center, The University of Rhode Island, and
Bureau for Global Programs, Field Support and Research,
Center for Environment, U.S. Agency for International
Development

Funding for the preparation and printing of this document was provided by the Coastal Resources Management Project, a Cooperative Agreement between the U.S. Agency for International Development and the University of Rhode Island.

For bibliographic purposes this document may be cited as:

Crawford, B.R., Cobb, J.S., Chou, L.M. (eds.). 1995. *Educating Coastal Managers: Proceedings from the Rhode Island Workshop*. Coastal Resources Management Project, Coastal Resources Center, The University of Rhode Island, and Center for the Environment, U.S. Agency for International Development. Narragansett, RI, USA. 184 p.

An electronic version of this document is available through the Coastal Resources Center's World Wide Web Site <<http://brooktrout/gso.un1.gso.uri.edu>> or directly by anonymous FTP at <<ftp://brooktrout.gso.uri.edu/pub>>.

ISBN No. 1-885454-02-3
CRC Technical Report No. 2089

Rapporteur's Report Coastal Management Training and Degree Programs: Status and Trends	89	SECTION 5 STRATEGIES FOR BUILDING UNIVERSITY CAPACITY An Integrated Program for Educating and Sustaining Coastal Managers <i>David Gitlitz</i>	147
SECTION 3 EXPERIENCE IN CAPACITY BUILDING: CASE STUDIES AND LESSONS LEARNED Development of the Coastal Resources Institute (CORIN) <i>Somsak Boromthanarat</i>	93	Roundtable Discussion The Changing Nature of Educating Coastal Managers— New Paradigms, Technology, and Approaches	150
Coastal Resource Management: Education and Capacity Building in Government, Community, and the University <i>Kenneth R. Brown</i>	97	Rapporteur's Report Recommendations for Building University Capacity in ICM—Program Models and Curriculum Issues	152
Building Capacity for Coastal Management at Universities <i>J. Stanley Cobb</i>	102	Rapporteur's Report Recommendations for Building University Capacity in ICM: Human Resources Issues, Institutional Strengthening Issues, Consultative Arrangements, and Partnerships	156
Capacity Building: A Case Study of the Marine Science Institute, University of the Philippines <i>Edgardo Gomez</i>	110	Plenary Discussion Recommendations for Building University Capacity in ICM	158
Rapporteur's Reports Experience in Capacity Building: Case Studies and Lessons Learned	115	SECTION 6 APPENDICES Appendix A: Workshop Agenda	163
SECTION 4 NETWORK AND PARTNERSHIPS The Network for Environmental Training at Tertiary- Level in Asia and the Pacific (NETTLAP): An Experience in Environmental Networking <i>C.M. Madduma Bandara</i>	119	Appendix B: Workshop Participants	167
MEDCOAST Initiative: Contributing to the Environmental Management of Coastal and Sea Areas of the Mediterranean and the Black Sea <i>Erdal Ozhan</i>	123		
The TRAIN-SEA-COAST Program: A Decentralized, Cooperative Training Network for the Systematic Development of Human Resources <i>Stella Maris Vallejo</i>	128		
The International Ocean Institute Network <i>Margaret J. Wood</i>	133		
Rapporteur's Report Networks and Partnerships	141		
Rapporteur's Report Donor Initiatives for Building Human Capacity for Integrated Coastal Management	143		

ACKNOWLEDGMENTS

The Workshop on Educating Coastal Managers was built on the great efforts of the many organizations and individuals that have contributed to this topic. Their groundbreaking work is gratefully acknowledged.

Many individuals contributed to the organization of the workshop. Beth Fuller coordinated the logistics, travel, and administrative details prior to and during the workshop. CRC's administrative support staff, Cindy Moreau and Wendy Thiel, also contributed to these efforts. Michelle Moulton typed and retyped drafts and reports and with student assistant Chris Fox helped set up the workshop secretariat office and handled airport transportation. URI's International Student Services assisted with U.S. visas. The staff of the W. Alton Jones Conference Center provided fine meals and an overwhelming show of hospitality, making the conference a memorable experience for all. The organizing committee included two distant members, Chou Loke Ming in Singapore and Max Aguero in Chile who, along with URI members Brian Crawford, Stan Cobb, Niels West, and Robert Miller, helped to determine workshop objectives and the agenda and identify participants via fax, phone, and the Internet. The Internet itself deserves a mention since it helped speed and reduce the cost of communications. Jackleen de La Harpe copyedited the entire proceedings.

The participants' home institutions provided time for them to attend the workshop and, in several cases, contributed to the cost of travel. UNEP, through the Priority Action Programs Regional Activities Centre, contributed travel financing for several participants. The U.S. Agency for International Development, Bureau for Global Programs, Field Support and Research, Center for Environment, provided the bulk of the financing making this workshop possible.

Most importantly, we thank all the participants who worked so hard and whose efforts resulted in the preparation of the background papers, rapporteur's reports, and the Call to Action. They braved the end of New England's winter at the W. Alton Jones Campus, and brought a warmth of spirit that melted away the

last of winter's ice from the ponds. It is our sincere hope that all the participants who contributed a wealth of ideas and recommendations returned home with an invigorated sense of determination for taking action. Collectively these actions will help advance the goal of enhanced capacity for educating coastal managers and, ultimately, an improved quality of life for all people and species inhabiting coastal regions of the world.

The Editors

FOREWORD

In March 1995, the Coastal Resources Management Project, a cooperative effort of the United States Agency for International Development (USAID) and the University of Rhode Island's Coastal Resources Center, sponsored a five-day workshop on educating coastal managers. Participants reviewed existing educational programs, defined the needs of the profession, and suggested strategies for building the capacity of universities to contribute to national, regional, and international initiatives in coastal management.

The participants recommended a strategy organized around (1) short-term training programs to enhance the skills of today's active practitioners, and (2) enhanced university curricula to produce new coastal managers with greater theoretical and practical expertise in their field. While short-term training is available, the second element needs greater attention, as most universities in developing countries simply do not have the resources needed to strengthen their own people and programs.

Educational capacity-building is a long and expensive process. Current development philosophy and funding priorities preclude large-scale university strengthening efforts. However, various approaches to improving university programs in coastal management were suggested by workshop participants. Among these were the development of networks of universities involved in coastal management and partnerships between universities, coastal managers, government agencies, NGOs, and the private sector. Intellectual nourishment from real-life experiences of these practitioners will insure programs that are dynamic and responsive to immediate needs in the communities they serve.

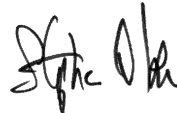
These Proceedings are directed at individuals designing or engaged in education and professional training for integrated coastal management. This includes university faculty and extension personnel, as well as trainers from NGOs and technical institutions. The ideas presented should also help guide administrators and decision-makers in universities, national governments, and the international development community toward promoting capacity-building for integrated coastal management. The document provides a wealth

of ideas and information to assist educators in the design of coastal management education and training programs and to support development of institutional strengthening strategies.

Recipients are encouraged to write to the Coastal Resources Management Project with views on these recommendations and on how they are contributing to the education of coastal managers.



David Hales, *Deputy Assistant Administrator*
Center for the Environment
U.S. Agency for International Development
Washington, DC 20523-1812



Stephen Olsen, *Director*
Coastal Resources Center
University of Rhode Island
Narragansett, RI 02882

EXECUTIVE SUMMARY

INTRODUCTION

In the past decade, the need for coastal management has become increasingly obvious. In 57 countries, plans for managing coastal areas have been developed. In many fewer, these plans are being implemented. The need for well-educated practitioners who can both plan and implement coastal management strategies is a critical issue in much of the world. As pointed out in Agenda 21, Chapter 17 of the Earth Summit, building capacity in individuals and institutions is necessary if coastal management is to be sustained:

“Coastal States should promote and facilitate the organization of education and training in integrated coastal and marine management ...” (17.15)

“International organizations ... should support (the capacity-building efforts of) coastal States, ... devoting special attention to developing countries” (17.16)

Such capacity building must emphasize the knowledge and skills required by the effective practice of coastal management. Integrated coastal management (ICM) is a new field, and there are only a few educational programs, primarily in developed nations, that address the topic. Formal educational programs and sustained training opportunities in developing nations are just starting to emerge. This workshop focused on strategies for initiating or strengthening university education for coastal managers.

This volume contains the background papers prepared for the workshop, rapporteur's reports from the plenary sessions, as well as summaries of the ideas produced in working sessions. The proceedings are directed at individuals with an interest in university level education and professional training in the field of coastal management. This includes university faculty and extension personnel, as well as trainers from NGOs and training institutes. The document provides a wealth of ideas and information to assist educators in the design of ICM education and training programs as well as the formulation of institutional strengthening strategies.

PURPOSE OF THE WORKSHOP

The purpose of the workshop was to bring together academics and experienced coastal management professionals to define the needs of the profession, review existing programs, and suggest ways in which universities can meet the growing demand for coastal management professionals. Workshop participants examined the knowledge, skills, and attitudes required of coastal managers in various geographic regions of the world and considered approaches to incorporate these requirements in curricula.

The following questions were debated by the participants:

- What are the training and educational needs of CRM professionals?
- What are the current programs, curricula, and approaches developed for the education of coastal managers?
- How can universities develop the capacity to prepare individuals for careers in coastal management?
- What are the opportunities to fund capacity-building initiatives for education in coastal management at universities?

WORKSHOP PARTICIPANTS

The workshop organizers strove for a geographic representation among regions, a balance among academics and practitioners, and a mix of representatives from a broad spectrum of developed and developing countries. The 35 workshop participants included educators and CRM practitioners from Latin America, tropical Asia, the United States, Australia, Canada, East Africa, the Pacific, and the Mediterranean, as well as members of the UN and donor community with program interests in this area. A list of participants and their addresses is provided in Appendix B. Academic representatives were senior faculty and administrators from educational institutions already engaged and committed to coastal management or from institutions

where additional development is being planned and is likely to occur. Practitioners from the community represented senior managerial and supervisory positions with a broad understanding and experience of coastal management planning, coordination, and implementation.

STRUCTURE OF THE WORKSHOP

A number of invited papers on theme areas, program models, and case studies were prepared by the participants prior to the workshop. The major emphasis was in assessing needs and examining how universities develop capacity to educate coastal managers. This proceedings includes papers of a comparative and conceptual nature as well as case studies of selected institutions and nations representing a range of potential alternative models. The papers were distributed in advance for all workshop participants to read prior to the workshop. The workshop proceeded under the assumption that everyone had read the background papers, and only a brief amount of time was provided for summary presentations by authors. Thus the bulk of the time was devoted to discussions of points raised in the papers, analysis of issues, and formulation of outputs. Each session had an assigned moderator and a rapporteur. In addition to general large group discussions, the workshop occasionally had structured activities so that smaller groups could work on selected topics and produce outputs for discussion and refinement with the larger group.

Previous Meetings and Workshops Contributing to the Advancement of Coastal Management Education

Several years ago, the Association of Southeast Asian Nations (ASEAN)/USAID Coastal Resources Management Project (CRMP) workshop on Coastal Area Management Education in the ASEAN Region (Chua, 1991) reviewed current curriculum offerings at a number of universities in the ASEAN region and proposed a model curriculum for a degree program in coastal management. The recent UN sponsored Consultative Meeting on Training in Integrated Management of Coastal and Marine Areas for Sustainable Development highlighted the current status of training initiatives in UN and international organizations and made recommendations for subsequent actions (UNDP/UNDOALOS, 1993). This led to the development of an Action Plan for Human Resources Development and Capacity Building for the Planning and Management of Coastal and Marine Areas and the establishment of the UN sponsored TRAIN-SEA-COAST Network (see paper by S. Vallejo). A recent workshop in Halifax, Nova Scotia, Canada, also looked at components of a core curriculum, and the standards that would help make coastal management a recognized discipline, and the costs associated with establishing programs (CZ Canada

Association, 1994). UNEP is currently sponsoring the Network for Environmental Training at Tertiary Level in Asia-Pacific (NETTLAP) which has as a subcomponent, a Coastal Zone Management Thematic Network. This network is looking at the development of curriculum materials to use in CRM-related courses at universities. Several workshops have been held on the subject of ICM training and education (see paper by M. Bandara). In addition, USAID/URI CRMP has gained substantial experience in addressing country-specific training needs—in the implementation of regional and international courses with partner institutions—and in capacity building at local universities in Thailand and Ecuador (see proceedings papers by S. Cobb and B. Crawford).

Workshop Contributions to Advancing Coastal Management Education

The goals and results of this workshop were quite different from the earlier workshops. First, the needs of the profession were defined in a unique consultation between practitioners and educators. Second, the capacity building experience of several pioneering universities which are attempting to meet those needs were carefully examined. The participants discussed how ICM human resource needs can be met, and they recommended strategies by which universities might develop new, or strengthen existing, educational programs in coastal management. The "Call for Action" summarizes the highlights of these discussions. The workshop was timely in that ICM educational programs in developing countries are expected to increase dramatically over the next decade. While the emphasis of the discussions was on building university capacity in developing countries, they offered an opportunity for academics in developed countries to review their own educational programs and contemplate their future directions.

RESULTS OF THE WORKSHOP

Training and Educational Needs of ICM Professionals

The workshop called attention to the need for educating a cadre of people who will be capable of undertaking the complex and integrative task of managing coastal ecosystems around the world. With the rapid growth of coastal management initiatives in response to Agenda 21, participants felt there is a great need for coastal managers, a need that will increase in the future. However, within each region, there are significant variations related to the stage of development of ICM programs and the level of national development. Participants were unable, however, to quantify the demand at the regional level.

In the Mediterranean and Black Sea regions, there are no national coastal management programs. However, many Mediterranean nations are moving quickly to establish them. The Black Sea lags further behind.

There was concern that without ICM programs, there may not be a demand for university graduates with explicit degrees in coastal management. However, there is demand for individuals with ICM skills working in more traditional positions.

Participants predicted that in the United States, the demand for coastal managers at the federal level will not increase, but that the increases will occur at the state and local levels and in institutions outside of government. It was also felt that there is a demand for individuals with a different set of skills that emphasize nonregulatory and voluntary approaches to management. While Canada and Australia do not have as long a history of ICM programs as the United States, their needs are similar and particularly strong at the local level where most ICM activity is occurring.

In East Africa, Asia, and the Pacific regions, the demand is exploding for coastal managers. The small group assigned to this region identified priority needs for education in the areas of management and group dynamics, an openness to community needs, and an interdisciplinary approach. As with other regions, the needs vary from nation to nation as the maturity of ICM program development vary considerably. Nations in the early stages of program development have priority needs for technical skills and planning methodology. In nations that already have on-going ICM programs, implementation skills and management skills are considered more important.

Needs also vary within the Latin American region depending on the stage of ICM program development. Participants felt that there is a need for educating individuals at multiple levels: (1) high-level central government officials, (2) mid-level managers, consultants, NGOs, and specialized university units, and (3) local-level officials, businesses, and resource-user groups. This group felt that, in many cases, such education is needed at a bachelor's level rather than at the master's level. They identified the need to educate not only the coastal manager, but a whole range of technical and sectoral specialists who contribute to such programs. The latter do not require as much depth in ICM as the coastal manager, but they do need to have an understanding of a common core that includes theory, philosophy, approach, and method.

All regional groups felt that needs vary from place to place and that educational programs need to take such variations into account. However, all groups felt an expanding need for professionals with an understanding of the underlying theory and methods which can be applied regardless of place, and the ability of coastal managers to take a broad and integrative look at issues and their solutions.

Status and Trends in University ICM Programs. More than a dozen coastal management programs have been

established at universities in developed industrialized nations, and similar degree programs are beginning to be established in low- and middle-income nations where the need and demand is the greatest. In addition, while there are numerous examples of university contributions to coastal management in terms of the integration of research, public service, and education in developed countries, there are few examples of developing country universities making similar contributions at the scale seen in some developed nations. To a large extent, this is because coastal management was a new field that was started in the United States two decades ago, and only now is beginning to be adopted elsewhere. An increasing number of universities in developing countries are likely to start to establish degree and service-oriented programs to meet the demands of new coastal management programs, as occurred in developed nations.

A review of current ICM educational programs demonstrates that there is a diversity of ICM educational program models. Such diversity is a product of variations in the expressions of a nation's approach to ICM and the structure and traditions of universities in each nation. Needs assessments have been important to formulating some of the more recent curricula. The workshop participants felt that there is no single best model, and that a multitude of approaches have and will be effective. It was also felt that educational programs should seek to achieve a balance between a technical orientation and an emphasis on policy and management. Internships and practicums are becoming an increasingly important component of ICM educational programs.

Building University Capacity. The participants recognized that there are at least two complementary and contemporaneous approaches to meet the demand for coastal managers:

- Short-term training which provides an orientation to the ICM field and develops specific skills of individuals already involved in coastal management programs or provides skills to someone who is contemplating entering the field
- Longer education programs that provide more depth and experience

ICM training may or may not be carried out at universities. Many training programs and networks now exist at the international, regional, and national level. Some are based within universities. ICM degree education, which is clearly a university function, is in need of greater attention, particularly in developing countries. Workshop participants recommended that the following types of university-based programs be developed or strengthened:

- Short-term training
- Part-time academic programs
- Enhancement of traditional disciplines such as marine science with ICM components
- Master's degrees in coastal management

Training, education, research, and extension services will be needed in the years ahead to strengthen and support government, NGO, and private sector initiatives in ICM. Strengthening university ICM programs, including the faculty, is particularly important in developing countries. At the moment, there is no clear consensus on the core theory and paradigm for ICM. However, this needs to be a central feature of any curriculum. Universities should take a lead by improving and developing theoretical concepts and tools for effective integrated coastal management. Participants felt that, as with other established disciplines, there needs to be a core of theory, knowledge, tools, and methods that defines the ICM field, regardless of geographic region or national context.

The greatest need, at present, is the development of university degree programs, primarily at the master's level, although in some nations a bachelor's degree program may be more appropriate. Participants saw two basic strategies for degree program development. The first is to integrate ICM coursework into existing curriculum within such established degree programs, such as Marine Affairs or environmental management, as an optional specialization. This strategy will better prepare professional to work in interdisciplinary and multisectoral teams with other specialists to formulate and implement ICM programs. The second strategy is to develop specific degree programs in coastal management for people intending to design, lead, or manage coastal management programs. In this case, employment opportunities may not specifically require a coastal manager but functionally, this is the role the job requires. Needs assessments—quantitative (numbers of people in various positions and institutions) and qualitative (curriculum emphasis)—must be conducted with government agencies and other institutions (which might hire graduates) when starting the development of a degree program and building support for it.

These two strategies could proceed simultaneously or sequentially. Potential institutional models include an interdepartmental program, a program imbedded within an existing or separate department, and regional or networked degree programs.

The framework curriculum for any degree program in coastal management should include curriculum in the following key areas:

- Theory and knowledge in integrated coastal management

- Such tools as the use of Geographic Information Systems
- Methods and skills in planning, management, socioeconomics, and group processes
- Practical field experience in the application of concepts and tools and to hone skills
- Ethics of public service and resource allocation, and
- Cultural literacy

Strengthening universities is a long and expensive process because it usually requires that faculty be allowed to study for advanced degrees in relevant fields, as well as the development of infrastructure to support the new responsibilities of the institution. An excellent example of this is the nearly two-decades long development of the Marine Science Institute of the University of the Philippines (see paper by E. Gomez). Current development philosophy and funding priorities currently preclude large-scale multi-university strengthening projects. However, various approaches to strengthening university programs in coastal management were suggested by workshop participants. Among these was the development of networks or partnerships of universities involved in coastal management. The workshop participants suggested:

- Building partnerships with ICM practitioners, government agencies, NGOs, and the private sector so that research and teaching are enriched by real-life experience and on-going ICM initiatives are nourished by new knowledge. This includes encouraging university faculty to participate in incipient and ongoing coastal management initiatives.
- Building, joining, or strengthening networks and partnerships among universities and between universities and other institutions with shared interests in the furtherance of ICM as a discipline and the education of coastal managers. Through such a cooperative approach, the benefits of an interdisciplinary ICM program are maximized.

Participants suggested that governments should be encouraged to support university strengthening efforts in ICM and facilitate cooperative partnerships between universities and government. They also suggested that development organizations need to incorporate capacity building as a part of all development projects that affect coastal regions. They acknowledged the support of development organizations for short-term training initiatives and networks, but they felt that more attention needed to be paid to long-term efforts, including support for continuing education academic programs and university degree programs. Lastly, participants felt that periodic meetings such as this workshop should continue to review progress and revise actions needed

to build university capacity in coastal management. It was recommended that a follow-up meeting be held in 1996 at Dalhousie University.

Recommendations. The more formal recommendations of the workshop are found in the “Call to Action” (see pages xii-xiv). This document was prepared by the participants and is also being published and distributed separately. The recommendations in the Call to Action are intended to raise awareness and provide guidance to senior level administrators and decision makers in universities, national governments, and the international development community of the steps that need to be taken to promote and support integrated coastal management capacity building initiatives. Further details about the recommendations of the workshop can be found in Section 5, Strategies for Building University Capacity.

REFERENCES

- Chua, T.E. (ED.). 1991. Coastal Area Management Education in the ASEAN Region. ICLARM Conference Proceedings 29. International Center for Living Aquatic Resources Management, Manila, Philippines.
- UNDP/UNDOALOS. 1993. Report on the Consultative Meeting on Training in Integrated Management of Coastal and Marine Areas for Sustainable Development. Sassari, Sardinia, Italy, 21 - 23 June, 1993. Organized by Division for Global and Interregional Programmes, United Nations Development Programme and, Division for Ocean Affairs and the Law of the Sea, Office of Legal Affairs, United Nations, New York.
- CZ Canada Association 1994. Training and Capacity Building in Integrated Coastal Management. Coastal Zone Canada Pre-Conference Workshop. Bedford Institute of Oceanography, Sept. 19 & 20, 1994. Organized by The Coastal Zone Canada Association, Halifax, Nova Scotia. 13 pp.

CALL TO ACTION

WHEREAS

Important coastal regions are suffering from degradation and need effective management.

Coastal regions are the primary habitat for people and contain a large share of the world's industry, food production, wealth, pollution, tourism, recreation, and biodiversity. Changes in coastal ecosystems are reducing the long-term capacity of these systems to provide people with an adequate quality of life and livelihood. Yet today's problems are mild when we recognize that the number of people inhabiting coastal regions is expected to double by 2050. Population growth and nonsustainable-use patterns are precipitating expressions of global change, including climate change, that will greatly complicate the challenges we face today. The primary objectives of Integrated Coastal Management (ICM) are to improve and maintain the quality of coastal regions to ensure a sustained flow of benefits to human societies and to improve the governance of coastal ecosystems.

There is a direct link between capacity building and effective ICM.

It has long been recognized that long-term responses to these threats must emphasize the development of local and national capacity for ICM as a fundamental part of sustainable development. This view was emphasized in Chapter 17 (Oceans and Coasts) of Agenda 21, the action plan of the 1992 UN Conference on Environment and Development.

The demand for well-educated individuals and proven concepts in ICM is expanding.

While ICM has been ongoing in several nations since the 1970s, the number of ICM initiatives—especially UN-sponsored and donor-funded projects in developing and newly independent countries—has expanded rapidly since 1992. This is creating an urgent need for refined concepts and tools and for expanded indigenous capacity in ICM.

Several sets of recommendations for ICM education and training have been issued, and the number of ICM capacity-building activities is increasing.

ICM education and training activities are evolving. This statement builds on previous recommendations developed at the 1990 Workshop on Coastal Area Management Education in the ASEAN (Association of Southeast Asian Nations) Region held in Singapore, the 1993 UN Action Plan for Human Resources Development and Capacity Building for the Planning and Management of Coastal and Marine Areas, and the Coastal Zone Canada '94 preconference workshop, Training and Capacity Building in Integrated Coastal Management. The Call to Action also recognizes the rapid expansion of short-term training programs and the global and regional networks that support ICM capacity-building initiatives. Degree programs that emphasize ICM, which have existed in developed countries for two decades, are just beginning to emerge in developing countries.

ICM is a relatively new discipline, and an accepted body of theory and methods is still emerging.

There are too few individuals skilled in coastal management to support the rapid expansion of initiatives in many locations. In addition, greater knowledge and more systematic methodologies are needed to address the critical policy issues inherent in ICM. Universities can and should play a significant role in addressing the current challenges of coastal management through education, research, and training. However, universities in many countries frequently do not have the capacity to realize their potential to fill this role.

THEREFORE

A strategy is needed that emphasizes long-term capacity-building efforts and the role of the university to complement and enhance existing initiatives and activities. The strategy should include the following elements:

- Education of policymakers, so that they will provide wise, substantial, and consistent support to coastal management initiatives
- Education of both current and future professional participants in the coastal management process to produce **sectoral specialists** who appreciate coastal

management and can contribute to the solution of coastal problems, and **coastal management professionals** capable of designing and leading intersectoral coastal management initiatives.

- Advancing the required research to formulate and test hypotheses related to coastal management. This is a necessary prerequisite for the development of effective ICM methods.
- Disseminating knowledge on trends in the condition, use, and governance of coastal regions and the implications of these trends for society and sharing emerging concepts and tools for effective management of these regions. This new body of knowledge should evolve in full partnership with communities of the world's coasts through adaptive/participatory research.
- Nurturing the systems that support the sharing of experience required to enrich knowledge and governance at all levels.

RECOMMENDATIONS

Universities and research institutions should:

Respond to this demand by developing and strengthening programs in research, education, training, extension services, and technical assistance that will contribute to sustainable ICM programs. More specifically, they should take the following actions:

Education and Training

Develop and/or strengthen interdisciplinary educational programs that will contribute to ICM. All programs should combine theory and practice and should emphasize the application of research to address important coastal management issues. Educational opportunities should include:

Short-term training. Training institutions in collaboration with universities should be encouraged to offer programs that satisfy the immediate needs of practitioners.

Part-time academic programs. These programs would allow professionals to obtain diplomas and/or degrees in coastal management.

Enhancing traditional disciplines. "Enhancement" would be accomplished through courses, seminars, or practica for professionals in programs ranging from journalism and education to law and across the sciences. The courses should be offered at both the undergraduate and graduate levels to introduce the concepts and principles of ICM to the expanding diversity of professionals who are in the coastal management process.

Master's degrees in coastal management. These degrees would provide the intellectual core curriculum for professional managers who are responsible for the

design and leadership of coastal management programs. This curriculum should include the theory and tools of coastal management and field practice.

Research

Improve theoretical concepts and research methodologies for effective interdisciplinary coastal management. These efforts should lead to the development and improvement of the best practices and tools, incorporating the various factors determining the social, economic, and environmental performance of coastal resources in an integrated approach.

Partnerships and Networks

Strengthen and create networks and linkages among universities. This includes encouraging university faculty to participate in incipient and ongoing coastal management initiatives.

Build, join, and strengthen networks and partnerships among universities, nongovernmental organizations, UN organizations, and the public and private sectors to complement existing efforts and avoid duplication. Through a cooperative approach, the benefits of an interdisciplinary ICM program are maximized.

Governments should:

- Work to fulfill the expectations of Agenda 21 and provide leadership in articulating firm and sustained ICM policy objectives that can form the basis for building capacity of current and future coastal managers
- Facilitate partnerships with universities in developing coastal management initiatives, share available information and facilities, and provide human resources for coastal management initiatives
- Support institutional arrangements with the strength and flexibility to promote the interdisciplinary/interagency teams necessary for both ICM capacity-building and ICM itself
- Incorporate integrated coastal planning and management into their development planning processes, and
- Support university strengthening efforts in ICM through national budgets, grants, and other means

Development organizations should, consistent with their mandates:

- Coordinate funding and other resources (such as infrastructure and personnel) nationally and regionally to maximize available resources
- Build on and expand successful indigenous efforts to increase capacity
- Include capacity building as an essential component

of all ICM programs, but also support long-term capacity-building initiatives apart from the needs of specific ICM projects

- Integrate ICM as an essential component of broader capacity-building programs in natural resources management and conservation of biodiversity
- Provide for ICM education and training in development projects that impact coastal resources
- Support the development of formal university and part-time academic programs in developing countries to complement and build on existing and future short-term training programs
- Continue short-term training programs for existing mid-level resource managers with coastal management responsibilities. In addition, support part-time academic programs so that these individuals have the opportunity to obtain diplomas and/or degrees
- Catalyze and support regional and global networks focused on the development of capacity building in coastal management, and
- Recognize that capacity building is a long-term effort and provide sustained commitments to programs with this objective

This Call to Action should be reviewed and revised periodically with the international community of ICM practitioners, educators, and trainers, in keeping with developments in the field and the implementation of recommendations.

SECTION 1

TRAINING AND EDUCATIONAL NEEDS OF ICM PROFESSIONALS: ANALYSIS OF DEMAND

Overview

The Skills, Knowledge, and Attitudes of an Ideal
Coastal Manager
Stephen Olsen

3

Latin America

The Status of Integrated Coastal Management and
Demand for Training of Coastal Management
Practitioners in Ecuador
Segundo Coello

8

Rapporteur's Report

Latin America: Training and Educational Needs
of ICM Professionals—Analysis of Demand

13

Mediterranean and the Black Sea Regions

The Status of Integrated Coastal and Marine
Areas Management and the Demand for Coastal
Management Practitioners: Mediterranean
and Black Sea Regions
Arsen Pavasovic

15

Rapporteur's Report

Mediterranean and Black Sea: Training and
Educational Needs of ICM Professionals—
Analysis of Demand

30

Asia, Pacific, and East Africa

The Status of Integrated Coastal Resources
Management (ICRM) and Demand for Coastal
Management Practitioners in the Government
Sector of the Philippines
Jessica C. Munoz

32

Rapporteur's Report

Asia, Pacific, and East Africa: Training and
Educational Needs of ICM Professionals—
Analysis of Demand

36

Rapporteur's Report

United States, Canada, and Australia: Training
and Educational Needs of ICM Professionals—
Analysis of Demand

38

Plenary Discussion

Training and Educational Needs of ICM
Professionals—Analysis of Demand

41

THE SKILLS, KNOWLEDGE, AND ATTITUDES OF AN IDEAL COASTAL MANAGER

Stephen Olsen

Coastal Resources Center
University of Rhode Island
Narragansett, RI, U.S.A.

ABSTRACT

The professionals required to effectively manage coastal ecosystems require a combination of knowledge, skills, and attitudes that are not efficiently provided by university curricula. When designing curricula for a profession requiring a sophisticated understanding of ecosystem and governance processes, the necessary integration across traditional disciplines should occur in the curriculum itself and not only in the heads of students. The defining features of a professional educated to meet the challenges of ecosystem management are described in terms of knowledge of strategic analysis and the policy process, knowledge of how ecosystems function, and cultural literacy.

THE NATURE OF THE CHALLENGE

Coastal management is important because coastal environments are the primary habitat for humans. Estimates suggest that 50 to 75 percent of the human population lives along coastlines. This population is already placing enormous pressures on the condition of coastal ecosystems. Unfortunately, today's challenges are mild compared to the challenges we anticipate by 2050. By then the great majority of a global population twice as large as it is today is expected to be concentrated along coastlines, largely in sprawling cities and primarily in the tropics (Merrick, 1989). The challenge faced by coastal managers is conceptually simple. The growing number of people, and more importantly, the dominant values and behavior of "modern" society that encourage profligate resource consumption and short-term gain rather than long-term sustainability, are reducing the capacity of coastal environments to sustain human populations. We, as a species, are running down those attributes of our primary habitat that make it suitable for what most consider an acceptable quality of life.

The importance and need for effective management of people and their impacts in coastal environments was highlighted in the 1992 Rio Conference on the Environment and Development. The problems are becoming increasingly well documented, and there is no lack of ideas and plans for what to do about them. The fundamental challenge for coastal managers lies in fo-

menting changes in societal values and behavior that these plans and programs require. The world is increasingly littered with "environmental" laws, regulations, and plans. Many are technically excellent, but they usually address only aspects of the closely interrelated issues of man's dependence upon his environment. Very few of them are being translated into meaningful action. Only a small proportion of these plans are being implemented, especially where the problems are most severe. This is because the people affected do not, or cannot, support the actions that are proposed. As a result, the symptoms of unsustainable levels of utilization of the coastal environments are rapidly spreading. In coastal environments, the classical evidence of environmental overuse and degradation include:

- Declining water quality in rivers, groundwater, estuaries, seas, and the nearshore ocean
- Degradation and destruction of habitats important to the production of food, fiber, and fuel, to maintaining ecosystem integrity and with important roles in the physical stability of the coastline
- Decline or collapse of nearshore fishery resources;
- Mounting user conflicts
- The inability of governmental organizations to avoid predictable adverse environmental problems or mediate conflicts among competing groups of stakeholders

Current and past losses in ecosystem quality is a problem of great significance. Yet what we have experienced thus far is dwarfed by what we can reasonably expect will occur within the lifetimes of today's children as ecosystem change on a global scale is expressed more strongly. Not only do today's children face a doubled population, but we expect changes in climate. These have drastic implications for where and how food is produced, the health of human populations, and such physical manifestations as rising sea level. We must be bold when we consider strategies for educating society to meet this challenge, and we must recognize that new approaches are in order.

It is essential that the concepts underlying coastal resource management goals, strategies and plans be sound and promote thinking that leads to a workable balance between the groups of people in a given place and the ecosystem of which they are a part. At least two concepts will be central to success. The first is that we should educate coastal managers to manage ecosystems. This requires systems thinking, focusing upon the connections among the parts and understanding the processes that drive living systems, including human economies. The second concept is that people who are trained for this profession must be equipped to practice adaptive management. They should view their work as a series of progressions through a learning cycle where they will discover what is feasible in a given place, and what strategies may be defined and achieved to attain more sustainable forms of development. Coastal management has already evolved. We have progressed since the early 1970s from coastal zone management (CZM), which recognized some of the more obvious development "mistakes" and social conflicts along the shorefront and responded with various forms of regulation, to integrated coastal management (ICM) that attempts to address the assumptions and policies underlying the development process and to experiment with new approaches to governance at the community level and within the agencies of central government. ICM programs, however, are still in their infancy and we are a long way from knowing, in terms of the operational realities of coastal management, what works, what doesn't, and why. This is particularly true in tropical ecosystems where the majority of the human population lives in poverty and where the ability of government to direct and modulate societal behavior, no matter what the scale, is tenuous and readily gives way to anarchy.

ECOSYSTEM MANAGEMENT

An idea central to all forms of coastal management is that the objective is not another attempt at sectoral management but, rather, orchestrating the interactions among the myriad human activities and the ecosystem in which they occur. Since the focus is integration and

a holistic approach, perhaps coastal management should eventually be defined as coastal ecosystem management. The term "ecosystem" conveys that an overt, systems approach is being used and, very importantly, that human societies are viewed as one element of the planet's living systems. The term "ecosystem management" focuses on coherent, self-defined, and self-organizing units comprising interacting ecological, economic, and social components (Slocumbe, 1993). The definition "ecosystem management" helps make transitions among the local, national, regional, and global scales. Ecosystem management conveys the integrated, macro view of problems and opportunities and can help in building the conceptual bridges between the long-term global expressions of anthropogenically-induced global change and the short-term and localized focus of the coastal management programs that exist today.

If we accept that we should foster the development of a new profession in ecosystem management, and that coastal managers are a subset of this larger grouping, then we need to examine the skills and knowledge that those practicing this profession require. Practitioners in coastal management must be capable of integrating concepts and information from a wide range of traditional disciplines spanning natural science, economics, law, and anthropology if they are to produce, test, and refine resource management strategies that make a discernible difference. A common assumption is that such professionals should be generalists who have been exposed to a variety of academic disciplines. We often hear that a student considering a career in coastal management should "first get a solid background in a traditional field, preferably in the natural sciences" and then go on to add skills and knowledge that will be useful when bridging among disciplines by adding degrees in fields such as marine affairs, business administration, law, or public administration. The drawback is that integration must occur primarily within the individual and is not the focus of the curriculum or the educational program itself. This is inefficient. We need people who, rather than being mere generalists, have been purposely educated to be specialists in the art and science of integrated thinking. The educational programs that we need to design should be designed primarily to impart the skills, knowledge, and attitudes required to be an effective agent of change in the rapidly evolving, technically complex field of ecosystem management.

PROFILE OF AN IDEAL COASTAL MANAGER

The knowledge and skills of an ideal coastal manager can be grouped into three broad categories:

Skills in Strategic Analysis and the Policy Process. Coastal management is primarily concerned with

managing people and their institutions. Its goal is to influence the values and behavior of a society to elicit a positive response to an integrated management scheme. The reason why many coastal management programs are not implemented is due to the lack of a large enough constituency, both in and out of government, who understand and support such initiatives. Successful coastal management programs need individuals with an ability to articulate a vision and inspire the collaboration required to achieve the program's objectives. Such abilities are, to some degree, innate and imbedded within the well springs of an individual's character. A set of somewhat different but comparable innate abilities shape a first-rate scientist. In both cases, education can nurture and develop these abilities. Thus, a top priority of a training program for coastal managers is to culture the skills required of an effective agent of societal change.

Closely coupled to leadership abilities is an appreciation of the policy process (see Fig. 1) and the skills to perform a strategic analysis of a situation. These abilities are essential to plan a course of action that will yield positive results and bring a program through to implementation. Strategic analysis is central for careers in business, government, the military, and in professions with many commonalities to coastal management like public health. Strategic analysis is the foundation for the powerful tools of social marketing, that, if well done, is highly effective in promoting contraceptives or the need for vaccination. It could be equally powerful in instilling modified behavior towards coastal resources and how they should be exploited and the benefits allocated. Strategic analysis reinforces the concept of an adaptive, learning approach to resource management which requires constant refinement and adjustment rather than imposing a static blueprint. Strategic analysis and planning is made challenging by the inevitable complexity

of the institutional context within which the management of coastal ecosystems is played out. The many years of experience in attempting to manage such ecosystems as Chesapeake Bay, the Baltic, and the Venice Lagoon demonstrate that no single agency can hope to formulate and implement the management measures required to maintain or restore the quality of these ecosystems. Collaborative action is both unavoidable and desirable. The ideal coastal manager, besides being a good strategist and leader, needs a solid foundation in the skills and knowledge required for:

- Conflict resolution
- Managing group processes
- Administration of complex institutions and programs
- Design and administration of transdisciplinary research programs
- Design and administration of public education and public participation programs
- Program evaluation

A parcel of skills that overarch the above list and are particularly important to an effective coastal manager is the ability to synthesize, interpret, and present complex sets of information. Educating coastal managers to use increasingly sophisticated technology to manipulate and present large data sets is something of an art form, but it, too, is closely linked to the skills required for sound strategic behavior. These skills are picked up along the way by the current generation of practitioners but again, can and should be made an explicit component of an education program.

Finally, if the strategies and trajectory of a coastal program are to be sustainable over the long term, they must be grounded in sound ethics. This, too, can and should be taught.

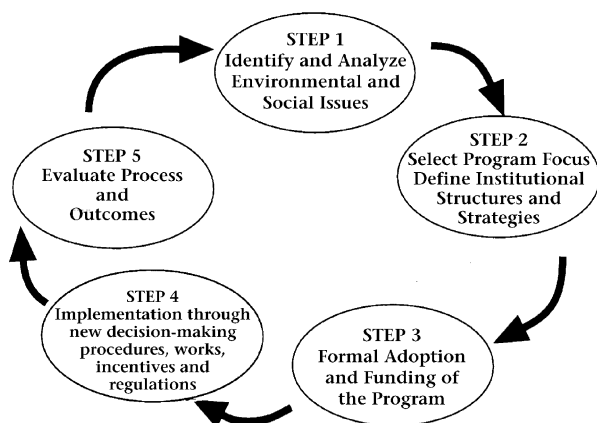


Figure 1. Steps in the evaluation of each generation of a Coastal Management Program (Olsen 1993)

Knowledge of How Ecosystems Function. This category contains more technical aspects of the profession and ones that are often stressed by those who enter resource management with an education in the sciences. The problem here is that a reductionist approach continues to shape how we educate people for careers in science. An ideal coastal manager must be able to transcend a particular scientific specialization and view the processes that governs the functioning of an ecosystem and how it responds to anthropogenic and natural change. Many of the interconnections and interdependencies between the coastal sea, estuaries, and their watersheds are poorly understood. It is of the utmost importance to have the technical background necessary to assess the implications of the scientific uncertainty that swirls around all important issues in ecosystem management and then being able to formulate a responsible course of action. A recent

article in *Science* (Ludwig, Hilborn and Walters, 1993) argues for the urgent importance of confronting uncertainty when attempting to manage resource exploitation. After surveying the failures of so many attempts to manage fisheries, they offer principles for effective management that include:

“Act before scientific consensus is achieved.”

“Rely on scientists to recognize problems, but not solve them.”

“Confront uncertainty. Once we free ourselves from the illusion that science or technology (lavishly funded) can provide a solution to resource or conservation problems, appropriate action becomes possible.”

If a coastal manager is to be capable of applying such principles, he or she must be solidly grounded in what is and is not known about how an ecosystem functions and how it may respond to the management actions being proposed.

Coastal ecosystems must be viewed and analyzed with human societies as an integral component, not something above or outside of nature. We can, therefore, include as an element of ecosystem function all that relates to how human economies function and evolve. Ecological economics is a very new discipline. It attempts to integrate the principles of economics and ecology within a single coherent framework. An ideal coastal manager should also be conversant with this body of knowledge. The free market and the profit motive are dominant paradigms of modern society and how we ascribe, or fail to ascribe, adequate values to ecosystem processes and natural resources and to balance among short-term and long-term benefits lie at the heart of the challenge that the coastal manager must confront.

In summary, the “scientific” knowledge and skills that should be imparted through the education of coastal managers must draw from:

- Systems ecology
- Resource economics
- Environmental engineering
- Landscape planning

Cultural Literacy. A final set of characteristics can be placed under the heading of cultural literacy. Coastal management is primarily concerned with managing people—the cultural diversity of the world’s societies is one of the most important characteristics about people. A coastal manager, with much effort and investment, could score high in the skills and knowledge outlined in the first two categories and still fail miserably as an effective practitioner if he or she does not, or cannot, appreciate the importance for the culture and traditions of the people they are attempting to serve.

As long as we continue to mistakenly define the problems that are confronted by coastal managers as technical issues amenable to technical solutions, we will continue to underemphasize the importance of cultural literacy. Only once we recognize that fundamental problems underlie the values and behavior of human societies will the importance of understanding the roots and the expressions of a given culture assume its proper significance. The ability to function within a culture usually requires knowing the language. If language ability is not possible, understanding religious thought or the history and art of a society will do much to make an ecosystem manager effective. Consider how often practicing resource managers find themselves pondering why a meeting, an educational campaign, or a resource management strategy fails. Very often the answer lies in the inability to understand the symbols, etiquette, cultural allusions, and, above all, the world view of a society. If a manager is aware of the importance of cultural literacy, they will ask the right questions and, as in natural science or economics, seek out those who possess cultural knowledge and incorporate it into the design and administration of their program.

THE METHODOLOGICAL CHALLENGE

This is a sketch of an ideal coastal manager, but reality is far from ideal. It is neither practical nor reasonable to think that educational programs can be designed that will produce the kind of “super person” that would encompass all the skills, knowledge, and attitudes enumerated in the preceding section. What is possible, however, is to debate whether or not these are indeed the features of an ideal coastal manager and to set about designing educational programs that will produce professionals who will reach towards the ideal.

Coastal management programs require a diversity of people. They include the enforcement officer, someone who processes permits, someone who works to educate and motivate the public, or someone who administers or participates in programs locally and within a central government. In an ideal world, many of those educated in coastal management would work within the many industries and businesses that function in coastal environments. What knits such a diversity of people together into a coherent effort is a shared world view. A common purpose and shared values is the precondition for social mobilization as any political, military or religious leader knows. Thus, the cornerstone of any educational program must be a coherent and continuous thread of ideas that capture both the nature of the challenge being faced and the nature of the response. This does not imply a slavish adherence to a “party line” but rather agreement on a set of principles and an information set that is accepted as central to the endeavor of people-centered ecosystem management.

A second point that is central to the formulation of curricula is that ecosystem management should be defined as a profession rather than an academic discipline. This reinforces the need for an explicit set of principles and behaviors that underlie advanced degrees for professions such as medicine, law, and business management. The Hippocratic oath of doctors and the principle that a lawyer must defend a client to the best of their ability regardless of whether that client appears to be guilty or innocent, must have its parallels in the ecosystem management profession. Education for a profession emphasizes practice, typically expressed as a heavy reliance on case studies. In medicine, the aspiring doctor works with patients, law students reexamine actual trials, engineers design and redesign utilitarian structures. The necessary integration of skills, knowledge, and attitudes occurs by confronting specific situations with all their peculiarities. This emphasis on pragmatic problem solving must also be a central feature of educating ecosystem managers.

How do we confront the problem of the undeniable need for specialists and the investments required to produce them? Surely the answer is that all those contributing to ecosystem management must understand the world view that underlies it. It would not be difficult to offer students who are earning degrees in natural sciences, economics, business, law, and education, courses that introduce the concepts and tools of ecosystem management. This could begin to overcome the current communication short circuits that are such an impediment to multidisciplinary teams and integrated management of any stripe. Only a subset of those who will contribute to ecosystem management need to become the "specialists in integration" required of those who must lead such initiatives. For these specialists, we must carefully define the educational standards that such individuals must attain to formally be recognized as having met the preconditions for the ecosystem manager's equivalent of a bar exam, P.E. or M.D. Such standards must include a foundation of the skills and knowledge required to analyze and formulate effective public policy, to understand how ecosystems function to behave in different cultural settings.

REFERENCES

- Ludwig, D., Hilborn, R. and Walters, C. (1993). Uncertainty, resource exploitation, and conservation: Lessons from history. *Science*, 260, 17, 36.
- Merrick, T.W. (1989). *World population in transition*. Washington, D.C.: Population Reference Bureau.
- Olsen, S. (1993). Will integrated coastal management programs be sustainable; the constituency problem. *Ocean & Coastal Management*, 21, 201-225.
- Slocombe, D.S. (1993). Implementing ecosystem-based management. *Bioscience*, 43, 612-622.

THE STATUS OF INTEGRATED COASTAL MANAGEMENT AND DEMAND FOR TRAINING OF COASTAL MANAGEMENT PRACTITIONERS IN ECUADOR

Segundo Coello

Programa de Manejo de Recursos Costeros (PMRC)
Guayaquil, Ecuador

ABSTRACT

Environmental degradation of Ecuador's coastal zone is widespread and threatens the quality of life for the 40 percent of the population that depend on coastal resources. To address these problems, Ecuador created a coastal management program to promote and develop the sustainable use of coastal resources through participatory and self-management methods.

THE NEED FOR INTEGRATED COASTAL MANAGEMENT IN ECUADOR

Ecuador is located on the equator on the Pacific coast of South America. More than 40 percent of Ecuador's 11 million people live in the country's four coastal provinces and rely on coastal resources for their livelihood. During the past decades, environmental degradation of the coastal zone has become widespread and threatens the quality of life of coastal residents and the survival of future generations.

THE COASTAL RESOURCES MANAGEMENT PROGRAM (PMRC)

The Coastal Resources Management Program of Ecuador (Programa de Manejo de Recursos Costeros, PMRC) was formally established in 1989 by Presidential Decree 375. It is based upon a recommended national strategy document prepared through the USAID-funded International Coastal Resources Management Project initiated in 1986 (USAID, 1994). Its mission is to promote and develop the sustainable use of coastal resources using participatory and self-management methods.

A key element of the national program was the creation of five Special Area Management Zones (Zonas Especiales de Manejo, ZEM) covering eight percent of Ecuador's mainland coast (see Fig. 1). The ZEMs encompass a wide range of coastal environments from mangrove-dominated estuaries to intensively used beaches and high bluff shoreline. They also incorporate a variety of urban forms and governance settings including

remote fishing villages, farming communities, tourism centers, and a large and sprawling urban center which is also a provincial capital. PMRC maintains permanent offices and staff in each ZEM.

The work of PMRC is characterized by an experimental learning approach and a continuous search to find ways to solve use and development conflicts in an integrated manner. The program is very clear about who it is working for and has adapted itself to the needs of those who benefit from it. PMRC recognizes that natural resources cannot be managed in a sustainable way unless the user groups actively participate in the decision making and management process. The project has not been rigid. Priorities, key issues, conflicts, and needs were not clear from the beginning, and PMRC has had to continuously change and adapt.

Presidential decrees in 1989 and 1992 created the legal framework of PMRC, which is administratively located in the Office of the President but has its staff in the main coastal city of Guayaquil. The basic elements of PMRC are:

- The Comisión Nacional de Manejo de Recursos Costeros (National Commission for Coastal Management, CNMRC), which is composed of five ministers (defense, agriculture, industry, energy and mines, and tourism), the general secretary of planning, and the Office of the President Secretary for Administration.
- The Executive Directorate, that oversees the activities and provides technical and administrative support to the ZEM Offices, Comités Zonales (ZEM Committees), Unidades de Control y Vigilancia

(Control and Vigilance Units, UCVs), and inter-agency working groups.

- The Comités Zonales (ZEM Committees) is a combination of user groups, communities, and local authorities. It oversees and promotes local participation in the preparation and execution of ICM, development plans, and solving local conflicts about the use of coastal resources.
- The Unidades de Control y Vigilancia (Control and Vigilance Units, UCVs) was formed by local authorities and led by the port captain to enforce existing laws governing the use and access to coastal resources.

THE PROFILE OF THE COASTAL RESOURCES MANAGER

Who is involved in integrated coastal management in Ecuador? A primary objective in Ecuador has been to build local and national constituencies for integrated coastal management (ICM). Strong constituencies will (a) press for improved resource management of coastal resources, (b) collaborate with PMRC and local and national authorities in identifying and implementing

practical solutions, (c) promote policy reform, and d) promote the expansion of ICM (Robadue, et. al., 1994). These constituencies have been slowly formed during the past decade through the different activities of PMRC (e.g., practical exercises, technical working groups, and public education (Robadue & Arriaga, 1993, and Coello et. al., 1993). While there are strong constituencies at the local and national levels, we still need a critical mass of people that can make ICM sustainable in Ecuador. The people participating in ICM in Ecuador can be grouped in two categories:

- People on the front line, those who are indirectly involved and deal with, on a daily basis, ICM issues and conflicts. This category involves PMRC staff and local user groups, authorities (e.g., Port Captains, Fisheries and Forestry Inspectors), and NGOs.
- People who are indirectly involved that occasionally participate or support ICM. This category involves national authorities (e.g., members of the CNMRC, governors, majors), politicians (e.g., congressmen), scientists and academics at universities and research institutes, journalists, and members of national and international NGOs or agencies dealing with devel-

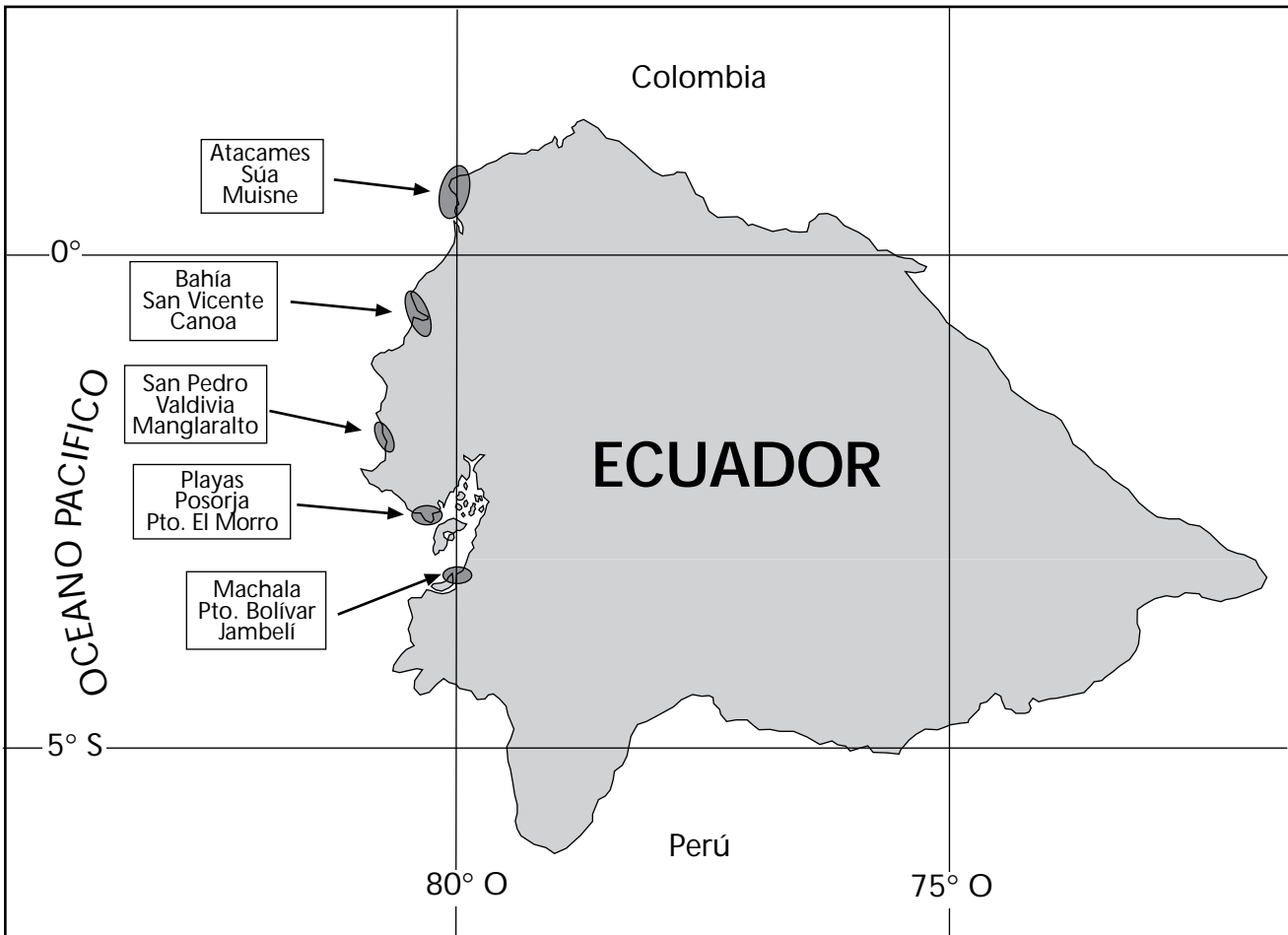


Figure 1. Location of the five Special Management Areas of PMRC

opment or environmental issues (e.g., Fundación Natura, USAID, IUCN, UNEP).

The people directly involved in ICM come from a wide range of backgrounds. Within the ZEM Committees, UCVs, and PMRC staff (see Table I), there is a full spectrum of expertise ranging from one extreme, fishermen and farmers that have not finished primary school to the other extreme, highly specialized professionals.

In the future, efforts must be dedicated to greater involvement of ICM planners, lawyers, journalists, and business specialists. Ecuador has very few qualified planners and lawyers specializing in environmental issues. Shorefront planners are greatly needed and, as far as I know, there are no shorefront planners available in the country. Journalists are now giving more attention to the relationship between development and environment; however, they seem to have difficulty grasping basic management concepts. We need to continue to develop journalists who specialize in environmental affairs. Finally, business specialists are needed to assist local groups in the development of environment-friendly enterprises that are profitable and sustainable.

TABLE 1: BACKGROUND AND LEVEL OF EDUCATION OF PMRC STAFF (HEADQUARTERS AND FIELD OFFICES)

Background	Technician	B.Sc.	M.Sc.	Ph.D.
Engineering ^a	1	3		
Social Sciences ^b		11		
Biological Sciences ^c	5	10		1
Military		1		
Others ^d	1			

^a Coastal Engineer, Sanitary Engineer, Chemical Engineer, Technician in Electric Engineering

^b 7 Teachers, 3 Sociologists, 1 Psychologist

^c 9 Biologists, 4 Fisheries Technicians, 1 Forestry Engineer, 1 Aquaculture Technician, 1 Agronomist.

^d Technician in Tourism

The development of ICM in Ecuador has involved complicated tasks like developing and executing management plans based on public participation, promoting a participatory governance system, and solving conflicts of use. These tasks required integrated efforts from people with diverse skills and knowledge and, in most cases, involved close interaction between technical people and the community.

ICM issues are diverse and complex and can be undertaken only by interdisciplinary working groups where individual visions of reality were unified to provide a comprehensive understanding of the issue, its implications, and integrated solutions.

The concept of ICM interdisciplinary working

groups has been used in different situations by (a) the Committees of the five Special Management Areas to analyze ICM issues, prepare, and implement long-term management plans and solve coastal resources conflicts between user groups of coastal resources, (b) UCVs for law enforcement, and (c) by technical interagency working groups to address key coastal management issues and make specific recommendations. The members of the interdisciplinary teams often had initial problems interacting because of their different backgrounds and training.

The composition of ICM working groups changes according to the issue that needs to be tackled. This implies that any person directly involved in ICM will interact and collaborate with a great number of people who have diverse backgrounds, training, and points of view.

IDEAS FOR TRAINING IN ICM

A small number of people have been trained in ICM by the program during the past decade. Training can be a valuable tool for building the critical mass of people that Ecuador needs who are involved in ICM. For this purpose, it must include both people that are directly and indirectly involved in ICM.

Training people who are directly involved must include not only professionals but community leaders (i.e., representatives of the user groups) and local authorities. They must receive knowledge and learn skills to improve their participation and contribution to the development of ICM. By contrast, the training for people who are indirectly involved must be oriented so that they can understand the principles, scope, and relevance of ICM. Great emphasis must be placed on training school and university teachers and journalists who can rapidly disseminate ICM principles and concepts.

The purpose of ICM training must not be to create a professional coastal manager but rather to facilitate the formation and development of interdisciplinary ICM working groups formed by experienced members of the community and qualified specialists.

How can people who have diverse backgrounds, skills, and knowledge interact and integrate their efforts? This cannot be done by simply providing them with tools and techniques. They must have a common goal and, most importantly, a common set of principles.

Community members and professionals, each of them with an individual vision of reality, are the "building blocks" of ICM working groups (see Fig. 2). Toynbee & Ikeda (1987) criticized the excessive degree of specialization of Occidental thinking that produces professionals with narrow views who are unable to handle global visions of reality. This has been true in Ecuador. However, for ICM working groups the inclu-

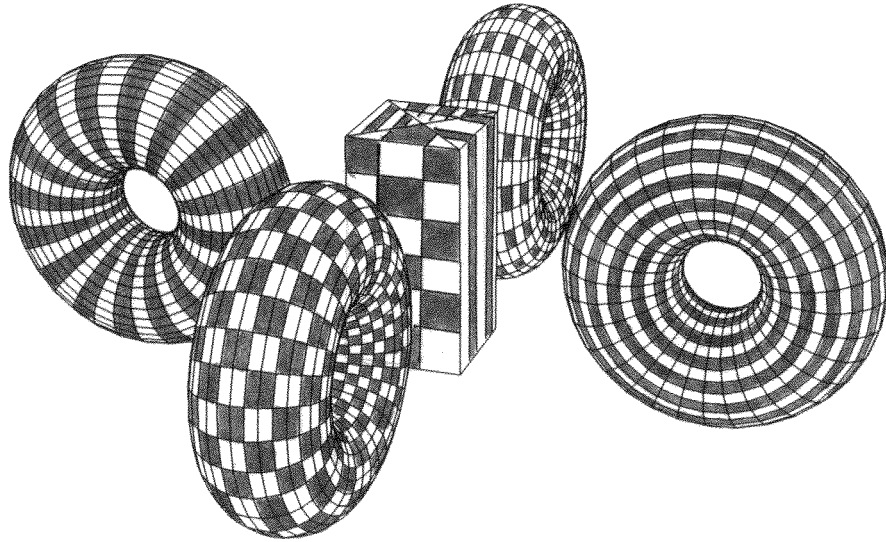


Figure 2. Members of the interdisciplinary ICM working groups have individual visions of reality.

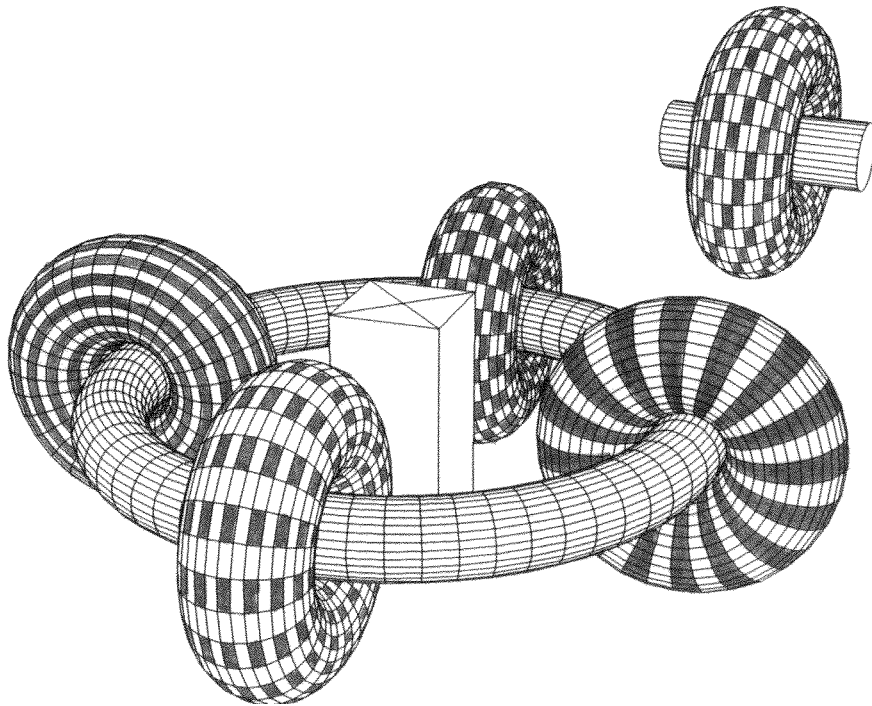


Figure 3. A common philosophy allows interaction among members of a working group and blending of individual visions to obtain a comprehensive understanding of any ICM issue and its implications.

sion of well-trained specialists is required, i.e., professionals with in-depth knowledge of particular subjects like coastal processes or mangrove ecology. ICM training must broaden the horizons of these professionals and provide them with a common “core” of knowledge that will allow them to (a) interact among themselves and with members of the community, and (b) blend their individual visions to gain a comprehensive understanding of any issue and its implications (see Fig.3).

The common core of knowledge can be thought of

as a common set of principles that are part of daily behavior or, being ambitious, a philosophy. This set of principles must include:

- The understanding that greedy use of natural resources can destroy a resource base, harm other resource users, and threaten future generations. For sound ICM, altruism must replace greed.
- The understanding that to tackle ICM issues, it is necessary to integrate (a) a specific view of the com-

ponents of the issue, (b) a unified global view of the issue, and (c) a view of the dynamics and trends of the issue.

- The understanding that local residents, resource users, and authorities must participate in an open process of decision-making and management of coastal resources.

Trainees also need a set of tools and techniques that includes:

- Techniques for team work. For effective ICM, each member of the group needs to (a) understand that every member of the team is a valuable component and has knowledge and a valuable perspective to contribute, (b) transmit their knowledge and perspective in a way that is understandable to other members of the team (including community members), (c) accept knowledge and varied perspectives from other members of the team that complement his or her own vision, and (d) tolerate and assimilate points of view that may oppose his or her own vision of reality.
- Policy development
- Principles for management of natural resources
- Basic project management and planning skills
- Solution of conflicts and environmental negotiation

TRAINING EFFORTS IN ICM

During the past decade, a small number of people have been trained in ICM on the job, through hands-on, trial and error and with a few short courses and internships. There is a growing need for ICM training in Ecuador. PMRC staff, in general, needs proper training as do members of the UCVs, related government agencies (e.g., National Fisheries Institute, National Institute for Forests and Protected Areas), local authorities (e.g., planning departments in municipalities), and user groups. There is also a great need to expand proper ICM training to groups indirectly involved in ICM.

Short courses and workshops have provided participants with general information (e.g., concepts) and knowledge of ICM but not skills development. However, they are powerful training tools, useful for members of the community, authorities, or ICM practitioners that cannot spend a long time on training. A set of very specific short courses and workshops needs to be developed to offer to people who are directly and indirectly involved in ICM. From this repertoire of courses, they can choose the ones that are most useful for strengthening their own capacity.

Training through internships has been widely and successfully used by PMRC. Six Ecuadorian and three foreign students have spent between six weeks and 18 months working on specific PMRC assignments of ac-

tivities. Internships are useful for training advanced students and professionals and must be explored further in the future.

No postgraduate or diploma training in ICM is available in Ecuador. Management of natural resources is still a relatively new field in Ecuadorian universities. However, there are several interesting initiatives. The School of Biology, Universidad de Santiago de Guayaquil, offers students in their final year a course called Conservación de la Naturaleza (Nature Conservation). It is an introduction to concepts and tools used to manage natural resources. A couple of years ago, the Escuela Superior Politécnica del Litoral (ESPOL) created a Coastal Resources Center which has, to date, presented two Latin American, two-week courses on ICM in conjunction with the University of Rhode Island. There is a great need to include introductory courses to ICM in all coastal universities, with emphasis on the schools of law, biology, economics, forestry, oceanography, architecture, engineering, and agriculture.

The number of people interested in ICM in Ecuador might not justify the creation of a postgraduate program. However, the growing interest of Latin American countries in ICM may justify the creation of a regional postgraduate training program. This idea must be explored further.

REFERENCES

- Coello, S., Proaño-Leroux, D. & Robadue, D. (1993). Special area management planning in Ecuador's Rio Chone estuary. pp. In J. Sorensen, F. Gable & F. Bandarin (Eds.) *The management of coastal lagoons and enclosed bays* (pp. 78-93). New York, NY: American Society of Civil Engineers.
- Robadue, D. & Arriaga, L. (1993). Policies and programs toward sustainable coastal development in Ecuador's Special Area Management Zones: creating vision, consensus and capacity. In O.T. Magoon, W.S. Wilson, H. Converse & L.T. Tobin (Eds.), *Coastal Zone '93* (pp. 2668-2682). New York, NY: American Society of Civil Engineers, USA.
- Robadue, D., Olsen, S.B. & Arriaga, L. (1994). New approaches toward sustainable development of coastal ecosystems: Lessons from Ecuador's coastal management program experience 1985-1994. Government of Ecuador-USAID-University of Rhode Island.
- Toynbee, A.J. & Ikeda, D. (1980). *Escoge la vida*. Buenos Aires: Emec e Editores.
- USAID (1994). Biodiversity conservation and sustainable use: USAID project profiles. Environment and Natural Resources Information Center (ENRIC): 121-123.

LATIN AMERICA: TRAINING AND EDUCATIONAL NEEDS OF ICM PROFESSIONALS—ANALYSIS OF DEMAND

RAPPORTEUR: Stephen Olsen

CASE PAPER PRESENTATION: S. Coello

Discussants: S. Coello, S. Olsen, E. Cervantes, J.S. Cobb, J.L. Ferman, M. DeMoranville, S. Vallejo, M. Aguero

DISCUSSION QUESTIONS

- What are the knowledge, skills, and attitudes that make successful coastal managers in the region?
- What types of positions are available for coastal managers and in what institutions (ICM agencies and related sectoral units) within the region?
- What are the expected changes in the quantity and type of jobs over the next decade in the region?
- What is the demand for coastal managers both quantitatively and qualitatively within the region?
- How do needs vary among nations within the region?

RAPPORTEUR'S REPORT

The working group on Latin America began with a review of the Ecuador case presented by Segundo Coello. The discussion returned frequently to the graphic he presented whereby the essential feature of coastal management education is a core of knowledge, skills, and attitudes that can be viewed as a "cable" which circles through many individual specializations drawn as "donuts." (See figures in S. Coello's paper in this proceedings.) The presentation stressed that coastal management education should, therefore, not attempt to create only coastal management specialists but provide the underlying principles and philosophy that make it possible for teams of people with diverse backgrounds to work together effectively. Of particular importance are abilities in conflict resolution, policy formulation, and a common world view.

Institutions and Positions Involved in Coastal Management. Drawing from the Ecuador case study, the group agreed that a three-tier model can be helpful when considering the people and institutions that become involved in the coastal management process. At the top are high level representatives of the various ministries of central government. In Ecuador, it is the

National Coastal Commission chaired by the chief of staff of the Office of the President. The second level comprises the coastal management program office and its staff. The third tier is the largest, comprised of municipal and provincial (or state) officials and representatives of the many user groups. NGOs, universities, consultants, and journalists may participate at all levels, but primarily in levels two and three. These players may be further subdivided into direct and indirect participants. Among the indirect participants, journalists are particularly important because of their role in educating the public, communicating the values and mission of the program, and shaping policy. Journalists urgently need to be educated on the core principles and values represented by the "coastal management cable" that connects various disciplines in Coello's figure.

Other professions that should be a priority target for the "cable" are lawyers and those responsible for major coastal-dependent uses (business), some of whom are traditionally educated through a business school curriculum. The group emphasized that, at all levels, the work occurs through working groups that may be more or less formally structured. Thus, the national commission, the coastal management program staff, and the community level "zonal committee" are all, in essence, working groups requiring an education in the principles and process of the "cable" in order to be effective internally and then to communicate with groups at other levels.

Changes in the Quality and Type of Jobs Over Time.

The group agreed that people educated in coastal management principles are needed and have important roles to play in countries without a formally constituted coastal management program. The group also agreed that the numbers of people involved will increase significantly with time if the coastal management process is effectively proceeding from one gen-

eration to another and expanding the scope of its activities with each generation. An important point here, however, is that the number of people within the coastal management program itself (level two) should not increase significantly. By far, the greatest increases should occur within level three as people educated in coastal management, and participating in the overall process, become incorporated within municipal and provincial (state) government and the private sector businesses that use coastal resources and depend both on their sustained quality and how they are allocated. The evolution in the numbers of people involved is shown in the following chart.

There was considerable discussion, and some disagreement, on how the "cable" should be provided by training and education programs. One discussion considered the needs of users in level three (e.g., fishermen with only a primary school education). Some felt that for society, such participants need only be made aware of coastal management issues and their implications. Others were convinced that such people need to be educated in coastal management principles and tools to be effective as active participants in the coastal management process.

We agreed that two strategies are needed and that universities should play a major role. For those participating in coastal management programs, the first strategy is to offer them a continuing education curriculum comprised of a coherent series of training programs

and perhaps a major paper. These people can rarely leave their jobs for one or more years to work on a university degree. At the same time as continuing education is offered, formal curricula for the next generation of participants in the coastal management process must be designed and put in place. These new university programs should define the coastal management process and principles as an approach to development, not merely a form of planning and regulation.

We noted that in Latin America many individuals who should participate in the coastal management process do not proceed beyond an undergraduate degree. Coastal management education should, therefore, be provided at the undergraduate level, perhaps as a specialization in a variety of traditional majors ranging from journalism, engineering, and business to the sciences. A coastal management curriculum is also needed in primary and secondary schools.

Variation in Needs by Country. The group agreed that the priorities vary somewhat from nation to nation depending on the maturity of the coastal management process and the availability of expertise in a country at a given time. Differences in the sizes of nations influence the number of people that need to be educated as does the organization of their educational system. The group agreed that distance learning and rapid communication through the Internet can promote sharing and cooperation in regional education.

INDIVIDUALS INVOLVED IN COASTAL MANAGEMENT PROGRAMS OVER TIME

Institutional Level	Number of People Involved		
	No Formal ICM Program	First Generation ICM Program	Maturing Program
Level One			
Central Government Officials	Few	Few	Some
Level Two			
The Coastal Management Program	None	Few	Few
NGOs	Few	Some	Some
Consultants	Few	Few	Some
Specialized University Units	Few	Some	Some
Level Three			
Municipal Officials	Few	Some	Most
State (Provincial) Officials	Few	Some	Most
Coastal Dependent Businesses/Users	None	Some	Most

THE STATUS OF INTEGRATED COASTAL AND MARINE AREAS MANAGEMENT AND THE DEMAND FOR COASTAL MANAGEMENT PRACTITIONERS: MEDITERRANEAN AND BLACK SEA REGIONS

Arsen Pavasovic

Priority Actions Programme/Regional Activity Centre
United Nations Environment Programme
Split, Croatia

ABSTRACT

This is a brief review of the state of the environment and the use of coastal resources in the Mediterranean and Black Sea regions. They are characterized by intensive pollution around coastal urban and industrial areas, high population pressure, uncontrolled development, and predominantly nonsustainable use of many coastal resources. The situation in the Black Sea region is significantly worse than in the Mediterranean, and, while it is approaching catastrophe, it is not yet irreversible.

The present state of the integrated coastal management (ICM) process in both regions is characterized by a number of ICM international and national initiatives. The most relevant being the Mediterranean Action Plan (MAP)-UNEP, the World Bank-METAP, and several European Union initiatives, as well as the GEF Black Sea Environmental Programme (GEF BSEP) supported by other (WB METAP, TACIS, PHARE) programs. Since the ICM activities in the Mediterranean started in the mid-1970s, the ICM process is far more advanced there—it might be considered to be in its early implementation phase. In the Black Sea region, only the prerequisites are being built up.

The analysis of the present position and role of ICM practitioners in both regions indicate that a large number of relevant positions are dispersed within a wide array of governmental and professional units and institutions. Six levels and various groups of ICM practitioners and their role in management were identified and described, resulting in an urgent need for their training, education, and capacity building (TECB). A prioritized list indicating groups and various needs has been presented. The approach to TECB for high- and medium-level managers should differentiate between ICM practitioners involved in managerial or professional activities—either integrated or sectoral.

The most appropriate type of TECB for the most ICM practitioners might be short-term education or training and, in particular, on-the-job training as part of ICM projects. Each ICM-related project, particularly those internationally funded or implemented, should have a strong training and capacity building component. Such a component has to be carefully designed in accordance with existing regional, national, local, or other relevant conditions and adapted to the present state and capacity of ICM practitioners.

Finally, the experience of the Priority Actions Programme (PAP), located in Split, Croatia, of the MAP-UNEP in ICM training and capacity building is illustrated and some practical recommendations are given. Included is a list of most relevant PAP documents used in the TECB process.

TABLE 1: THE BARCELONA CONVENTION AND ITS PROTOCOLS

UNEP: focal point for environmental actions and coordination within the UN system
Oceans: one of UNEP's priority areas
Regional Seas Programme (RSP): cooperation among the governments of the regions; coordination of actions through UNEP
The Convention: "umbrella" agreement providing obligation to implement measures against pollution of the Mediterranean Sea area and to protect and enhance the marine environment
Sources of pollution to be controlled: dumping, accidents at sea, seabed exploitation, land-based sources
Cooperation: in monitoring, research, emergencies
Major tasks: provision of technical and other assistance, priority given to special needs of the Mediterranean developing countries
Institutional arrangements: UNEP as secretariat, the Contracting Parties, MAP (the Coordinating Unit and 6 Regional Activity Centres)
Protocols: a) against dumping from ships and aircraft b) combating pollution by oil and other harmful substances c) on specially protected areas d) against pollution from land-based sources e) on seabed exploitation

STATUS OF INTEGRATED COASTAL AND MARINE AREAS MANAGEMENT AND CURRENT COASTAL MANAGEMENT INITIATIVES

The Mediterranean and the Black Sea areas are geographically connected by the Marmara Sea, but they are two different regions. Causes of pollution and depletion of resources are similar in nature in both regions, but the intensity of pollution and consequences for the marine and coastal ecosystems are fundamentally different. There are differences in the experience and in the human and institutional capacities for establishing and implementing the ICM process. Therefore, in this paper, the data and facts will be presented separately for each region whenever necessary or appropriate.

THE MEDITERRANEAN REGION

Certainly the most important coastal management initiative at the regional level is the Mediterranean Action Plan (MAP) established in 1975. All the Mediterranean coastal states and the European Union participated. The legal basis of MAP is provided by the Convention on the Protection of the Mediterranean Sea against Pollution and its related protocols, adopted in 1976 in Barcelona (thus known as the Barcelona Convention) and enforced in 1978.

The Mediterranean region after World War II was characterized by strong, often uncontrolled development, population growth in the coastal areas, and gradually increasing pollution. Some basic information on the Mediterranean region is presented in Annex I. Information on pollution in the region is illustrated in Annex II.

Basic data regarding the Barcelona Convention is presented in the Table 1. MAP is described in Table 2.

MAP is undergoing reorganization towards the implementation of the conclusions of the UNCED Conference in Rio in 1992. Accordingly, a ministerial conference held in Tunis in November 1994 adopted the "Tunis Declaration" and Agenda 21 for the Mediterranean. A proposal is being prepared revising the Barcelona Convention and a concept of the second phase of MAP. The objectives of this redefinition are more precisely defined goals and terms of reference, better efficiency, stronger emphasis on enforcing decisions, better exchange of information and experience, and a stronger involvement of the general public and NGOs in the ICM process. Furthermore, MAP Phase II envisages the establishment of a special Mediterranean Commission on Sustainable Development (see Table 3).

AGENDA 21 FOR THE MEDITERRANEAN

Adopted as a draft document to be further developed and finalized by MAP. The document is a transposition and adaptation of the document UNCED Agenda 21 to the Mediterranean conditions and is aimed at creating a framework of debate and research for the objectives to be reached in the Mediterranean region within the perspective of Agenda 21. The document is composed of four parts:

- Social and Economic Dimensions (7 chapters) elaborating objectives and activities to be implemented with regard, *inter alia*, to: International Cooperation for Sustainable Development, Combating Poverty, Demographic Dynamics and Sustainability, Integration of the Decision-Making Process.

TABLE 2: DEVELOPMENT OF MAP FROM 1976 TO 1994

1. **Preparatory phase (1976-1978):** definition of structures and programmed establishment of the Coordinating Unit, intergovernmental meetings, the Split meeting in 1978 - establishment of the Blue Plan and the Priority Actions Programme.
2. **Initial phase (1979-1984):** MEDPOL I - monitoring and assessment of pollution, beginning of the Blue Plan exercise, start of PAP activities, gradual increase of the budget, establishment of ROCC (later REMPEC) in Malta.
3. **The Genoa Declaration Phase (1984-1989):** MEDPOL I and II, research on the state of pollution in the Mediterranean, protocol on protection from land-based sources of pollution, launching of the SPA Centre in Tunis, full implementation of PAP (methodology of integrated planning and management, water resources management, soil protection, historic settlements, aquaculture, tourism harmonized with the environment, launching of pilot projects of coastal management), completion of the Blue Plan exercise at the regional level, REMPEC in implementation.
4. **Refocusing of MAP on coastal management (1989-1994):** Address of the Executive Director of UNEP on refocusing, MAP Coastal Areas Management Programme (MAP CAMP), studies of impacts of the climate change, MEDPOL II, Centre for the Protection of Historic Settlements, Centre for Environmental Remote Sensing, prospective studies at national and local levels, methodology of ICM, tools and techniques for ICM, training component.
5. **Refocusing on sustainable development (1994 -):** Agenda 21 for the Mediterranean, Tunis Ministerial Declaration, revision of the Convention, MAP II, MAP CAMP, Mediterranean Observatory.

TABLE 3: TUNIS 1994 DOCUMENTS

Tunis Declaration on Sustainable Development in the Mediterranean Basin: Adopted by the Ministers in charge of the environment in the Mediterranean countries and the member of the European Commission responsible for the environment. The signatories commit themselves to *inter alia*:

- Promoting consideration of sustainable development when devising and implementing national and local development policies
- Working to mobilize the necessary resources and means for sustainable development
- Developing bilateral, regional, and multilateral actions
- Encouraging partnership and codevelopment initiatives to strengthen national capacities for implementing sustainable development
- Investigating the measures best suited to the objectives of sustainable development and making necessary institutional arrangements

- Conservation and Management of Resources (14 chapters): Integrated Approach to Planning and Management of Land Resources, Managing Fragile Ecosystems, Protection of Marine and Coastal Areas, Integrated Approach to Water Resources Management.
- Strengthening the Role of Main Social Sectors (10 chapters): Role of NGOs, Role of Local Authorities, Role of Business and Industry, Scientific and Technological Community.
- Implementation (8 chapters): Promotion, Education, Training and Public Awareness, International Cooperation for Capacity Building, Information for Decision Making.

DECLARATION ON ESTABLISHMENT OF THE MEDITERRANEAN COMMISSION ON SUSTAINABLE DEVELOPMENT

The ministerial conference recommended that the next Conference of the Contracting Parties to the Barcelona Convention be held in Barcelona in 1995 to establish within MAP a Mediterranean Commission on Sustainable Development with the basic objective to guide MAP and assist Mediterranean coastal states in the implementation of the UNCED Agenda 21 and MED Agenda 21.

MAP activities directly related to ICM are implemented through the MAP Coastal Areas Management Programme (MAP CAMP). The basic structure of such a

programme is given in Annex III. Within MAP CAMP, the following programs have been implemented: Syria (completed in 1992), Turkey (the Izmir Bay - completed in 1993), Croatia (the Kastela Bay - completed in 1993), and Greece (the Island of Rhodes first phase completed in 1993). The ongoing projects are the Albanian coast (partly sponsored by the WB-METAP), the Island of Rhodes - second phase (fully sponsored by the EIB), and Fuka (Egypt). A project in Tunisia (Sfax) will be launched in 1995, and projects in Israel, Lebanon, Malta, Algeria and Morocco will be started later.

Apart from MAP, participants in ICM activities in the Mediterranean are the EU (Corinne, MEDSPA, desertification), WB-METAP, The European Investment Bank, and GEF. The recently launched PHARE-GEF-WB-UNEP Danube Basin Environmental Programme involves Slovenia and Croatia (of the Mediterranean countries) and Bulgaria and Russia (of the Black Sea countries).

Numerous initiatives and comparatively good results have been achieved within national programs implemented in a large number of Mediterranean countries, especially in France, Israel, and Tunisia. Good experience in and results of regional (subnational) planning is a prerequisite of successfully launching ICM. Good results are achieved within internationally sponsored ICM programs, but they are not as successful as national initiatives.

Due to considerable differences in the level of development, and in the capacities for ICM, the present national practices of ICM differ considerably from one Mediterranean country to another. Unfortunately, for most of them, traditional, sectoral planning is dominant, resulting in inconsistent ICM results. Some of the features of such practice are:

- Inappropriate and unrealistic planning, conflicting land and sea uses
- Postponed construction of pollution treatment facilities
- Absence of long-term development strategies, with priorities given to short-term objectives and interests
- Inappropriate institutional arrangements for coastal management

Furthermore, in many countries there is still insufficient, incomplete, or nonsystematized knowledge on coastal and marine ecosystems, a low level of involvement of the general public in coastal management practices, and insufficient knowledge on ICM policies, methodology, and the relevant implementation tools and techniques.

THE BLACK SEA REGION

Of the six countries bordering the Black Sea (Black Sea), five (all except Turkey) were, from the end of the World War II until the fall of the Berlin Wall, part of the Eastern block and developed within the Soviet-dominated socialist political and economic system. The consequences of such development are, among others, a serious degradation and overexploitation of coastal and marine resources, and extremely high pollution of the marine environment. "The Black and Azor Seas system has become the first semi-enclosed sea where an almost complete destruction of the commercially productive components of the ecosystems seems a realistic possibility in the near future in the absence of remedial actions by the six coastal states" (Report of the WB-UNDP-UNEP Programme Coordination Meeting for Environmental Management and Protection of the Black Sea, 1992). The main features of the situation in the Black Sea region are presented in Annex IV. Under such conditions, it wasn't possible to promote in time the concept and practice of ICM, although numerous scientific research projects and an abundance of collected data provided a good basis for launching such a process. The conditions for applying the concept and accepting the principles of sustainable development and environmentally sound integrated planning and management of coastal and marine areas were created only recently by the changes (or transition) in the social system and creation of new coastal states.

Under the new conditions, a considerable awareness developed in the authorities and general public. It was very apparent that there was an urgent need for action by all Black Sea countries aimed at creating conditions for a gradual improvement of the state of the region. Under the conditions of transition, the institutional and legislative systems are also subject to reconsideration and revision, which facilitates the introduction of more adequate institutional and legal arrangements for ICM. Gradually, numerous initiatives of international institutions and some developed countries appear, aimed at establishing and implementing ICM-oriented projects, directly or indirectly. The most significant project is the GEF Black Sea Environmental Project (GEF BSEP), with program and financial support by the WB, the EU through the PHARE and TACIS programs and, on a bilateral basis, Canada, The Netherlands, Switzerland, and France.

The international legal basis of the GEF BSEP is The Convention on the Protection of the Black Sea against Pollution (Bucharest, 1992) entered into force in 1994. In 1993, a meeting in Odessa adopted The Ministerial Declaration on the Protection of the Black Sea. The declaration was signed by the ministers in charge of environmental protection. This declaration is important because it defines concrete forms of cooperation, priority tasks, and the terms for their implementation.

TABLE 4: THE BLACK SEA - INTRODUCING ICM POLICIES AND INSTRUMENTS

General Framework: The end of the Cold War, new independent states, new political and socioeconomic context, transition period.

The Bucharest (1992) Convention on the Protection of the Black Sea against Pollution: Entered into force in 1994, legal, institutional, and technical framework for Black Sea ICM. Protocols on prevention of pollution from land-based sources and from dumping.

The Odessa (1993) Declaration (Ministerial Declaration on the Protection of the Black Sea): Clear policy statement and time frame; identification of policy priorities. The Declaration calls for "urged, comprehensive, consistent, and coordinated activities on, *inter alia*: common environmental quality objectives, urgent construction of sewerage systems and wastewater treatment plants, restoration and protection of biodiversity, development of national emergency response plans, elaboration and implementation of national coastal zone management policies including legislative measures and economic instruments, introduction of compulsory EIA."

The GEF Black Sea Environmental Programme (GEF BSEP): Launched in 1993; the Programme Coordinating Unit (ecu) established in 1994; basic objectives to create and strengthen regional ICM potentials, develop and implement relevant policies, encourage and provide investments in sustainable development and environmental protection and enhancement; in 1994, the following Working Parties and Activity Centres were established for emergency response (Bulgaria), regular monitoring (Turkey), special monitoring and quality criteria (Ukraine), protection of biodiversity (Georgia), ICM (Russia), Fisheries (Rumania); PCU coordinates the activities on: data-base and GIS on environmental economics and on environmental quality criteria, standards, and legislation.

The World Bank - EMTEN: Actively involved in BSEP-ICM; additional support to BSEP through PHARE, TACIS, and on a bilateral basis (Canada, The Netherlands, Switzerland, France).

Also that year, the GEF BSEP activities were launched. The basic information on the Convention, Declaration, and BSEP is presented in Table 4.

The Danube River Basin Environmental Programme is of a great importance. It is funded by the European Commission PHARE Regional programme, GEF, WB, UNEP, EBRD, Austria, The Netherlands, USA, and the Barbara Gauntlett Foundation. The Danube is one of the largest rivers which contribute greatly to the pollution of the Black Sea. The results of this program could make a good contribution to the improvement of the situation, especially in the Black Sea northwestern shelf where large areas are affected by catastrophic eutrophication phenomena.

Among the national initiatives, it is important to mention the Decree of the President of the Russian Federation regulating the protection and reclaiming the natural resources along the Russian Black and Azor Seas coasts. That Decree defines the obligation to: (a) identify and adopt the list of natural resources to be included in the category of "Federal Natural Resources" (b) identify the executive bodies to implement the relevant management practices (c) organize a 1994-1996 program of comprehensive ICM, (d) identify borders of protected natural areas, and (e) determine the priorities for use of the natural resources. The Decree was enforced in 1994, and is now being implemented. The BSEP ICM action provides a good possibility to offer the best experience in ICM to the Russian national authorities implementing the Presidential Decree to con-

sider and apply if and when deemed appropriate.

Regarding other initiatives, the Georgian Municipal Infrastructure Rehabilitation Project (MIRP) will be funded by the loans from the WB, and the Georgia ICM program will be funded by GEF BSEP and the national authorities.

In Bulgaria a strategy for sustainable development of the national Black Sea coast was adopted in 1992, developed with the assistance of WB experts. Furthermore, in 1993, the National Black Sea Coast Regulation Act came into force and, consequently, an interdepartmental council on the regional development and self-government was set up.

In conclusion, the establishment of ICM process in the Black Sea region is in the initial phase. The favorable factors included a comparatively satisfactory scientific and data base; certain experience in land-use and regional planning (but on wrong conceptual and methodological bases); a strong will and awareness of the authorities and the general public and a considerable international initiative in courses and/or in preparation; and certain aspects of the transition period that could facilitate the initiation and gradual establishment of ICM process. The unfavorable factors include the extremely difficult economic situation in the region, insufficient institutional and human capacities for ICM, lack of appropriate market mechanisms, and especially the fact that to achieve even initial results, a lot of time and considerable international help will be needed.

Finally, ICM in the Black Sea region is at least 10 years behind the Mediterranean region. However, there is a good possibility to reduce that gap if the existing triggering factors are efficiently used.

ICM IN THE NEXT DECADE (1995–2005)

The experience gained in the Mediterranean region and an assessment of the situation in the Black Sea region shows that in the next 10 years the process of creating conditions for sustainable development and implementation of the principles will continue. Within that framework, with regard to the coastal zone (ICM), the ICM process would represent at the same time a prerequisite and a major implementation tool. It can be expected that all countries will establish National Commissions for Sustainable Development according to the conclusions of the UNCED and gradually change their present legal and institutional arrangements for ICM.

With reference to ICM of both regions, the following can be expected:

- Establishment, improvements and/or amendments of national legislations, norms, and standards, where the adoption of a National ICM Management Act could be the final goal of many countries
- Definition of national development policies for achieving sustainable development—in the case of ICM, those should be national ICM policies and objectives
- Establishment, within the existing institutional arrangement or through its adaptation, of appropriate institutional forms for achieving horizontal and vertical integration of the coastal zone management process and improving its efficiency
- A larger share and greater significance of environmentally oriented programs within the national development program especially those that enable a better and more efficient use of coastal resources securing, at the same time, the protection or enhancement of the environment (tourism, fisheries, aquaculture, production of healthy food, renewable sources of energy), and of the programs aimed at the application of clean technologies, pollution reduction (especially wastewater treatment plants), and improvement of the quality of life
- Creation of ICM-oriented research programs according to the priorities defined by the National ICM policies, aimed at improving the scientific basis and information systems
- Establishment or strengthening of university centers oriented to the process of sustainable development, integrated resources, ICM management, and environment-related issues
- Introduction or strengthening of the application of market mechanisms, environmental economics, and economic instruments relevant for ICM gradual prevailing of the “integrated” over the “sectoral” approach to planning and management
- Strengthening of the specialized and “general” NGOs and their more intensive and qualified involvement in the ICM process, as well as of the general public
- Increase of international funds aimed at the implementation of ICM projects and programs and greater help to the developing coastal states in the establishment of the ICM process.

Within this general framework of possible future development, the processes that will take place include identification, adaptation, and application of tools and techniques of ICM: information systems and GIS, resource evaluation, methods of environmentally oriented economic evaluation of development processes and projects (cost-benefit analysis), environmental assessment (especially EIA), preparation and use of systemic prospective studies, and various economic instruments of ICM. Substantial progress will be made regarding the concept and methodology of the ICM process, its better adaptation to the conditions of developing countries, and its application, not only in the internationally sponsored projects, but also in the everyday management practice at the national, ICM, and local levels.

The expected improvements and development will be possible only if the following prerequisites are secured:

- Coordinated efforts of all countries of the regions and harmonized action of international factors
- Political stability (termination of the current and absence of future conflicts and hostilities)
- Conceiving and implementation of a good and to specific national and local conditions adapted program of ICM related to capacity building, training of coastal managers and other professionals (including those involved in the most relevant business activities), further raising of NGO capacities and involvement, and raising public awareness and its understanding of ICM-related issues.

ICM AND EXISTING INSTITUTIONAL ARRANGEMENTS, COASTAL MANAGEMENT, AND EXISTING GOVERNANCE ARRANGEMENTS

This portion should illustrate, as much as possible, the “types and numbers of ICM-related positions within government and supporting institutions such as NGOs, as well as the roles and responsibilities of ICM

professionals”—a very ambitious requirement. Namely, there still does not exist a comprehensive study using a common approach to analyze and compare the situation in the Mediterranean region although the institutional arrangement is highly important for the establishment and implementation of the ICM process although there are a number of documents analyzing that importance or illustrating the situation in individual countries. At the same time, the GEF BSEP ICM program envisages, already for the period 1995-96, the preparation of such studies, first on the national basis, and later a regional overview.

MAP, and especially its Priority Actions Programme (PAP) whose mandate includes the field of ICM planning and management, identified, within the preparations for individual ICM programs, the institutional arrangements of the countries in which the programs were implemented. Thus, PAP has information on the institutional arrangements of a large number of Mediterranean countries.

When synthesizing the PAP information and experience, it is necessary to emphasize the fact that in the region, there are great differences among the countries in the surface area, population, degree of development, length of coastline, level of development, and urbanization of the coast, wealth and ways to exploit resources, political systems, and form and manner of governance arrangement. Other, no less important, factors have to be added such as historic, national, cultural, religious and other specificities, then numerous traditional management patterns which determine or precondition individual ICM activities. Therefore, a ICM program, including the ICM-capacity building and ICM-practitioners training programs in the Mediterranean, cannot be successful unless the specific conditions of each country are known and respected. From the author's limited experience in the Black Sea region, it could be assumed that the above differences and specificities are less pronounced in that region.

Despite this, the general institutional arrangement relevant to ICM is common to both regions. That scheme can be defined as multilevel and multi-sectoral, with frequent specific solutions within individual sectors and, in a certain number of cases, with specific arrangements of inter-sectoral integration.

Departing from the Mitchell's three-dimensional model of coastal zone management, it could be said that:

- From the point of view of policy structure variables, there is a wide array ranging from strong administrative control to pronounced, but not exclusive, rights of private interest groups
- Administrative variables range from prevalingly sectoral planning to, often insufficiently developed, broad functional responsibilities

- Policy orientation is increasingly turning towards the concept of sustainable development, i.e., to development which implies environmental protection and preservation

Typical management levels in both regions are presented in Table 5. Of the six levels, it is mostly "National I", "Subnational I" and "Local I" that are relevant to national ICM. In any case, if the local conditions are not well known, the "Local II" level must not be excluded.

TABLE 5: INSTITUTIONAL ARRANGEMENT IN THE MEDITERRANEAN AND BLACK SEA REGIONS MANAGEMENT LEVELS

1. International	Conventions, protocols
2. National	Presidency of State, National Government, Ministries, National (State) Agencies, National (State) Corporations, National Offices
3. Subnational I	Regional governments and ministries, or departments and offices. Also, Autonomous Region, Region, County, Province, Department, Mohafaza, Willaya, Governorate
4. Subnational II	Province, association of communes
5. Local I	Municipalities, Communes, City Councils, local (communal or other) agencies
6. Local II	Arrondissement, quartiers, small local units, small settlements and rural administrative and/or self-management units

The sectoral governance arrangement follows, more or less, the standard sectoral classification. This is, as a rule, more diversified in some developed countries. In many countries, the most relevant sectoral activities for ICM are organized in larger sectoral units, such as fisheries and aquaculture within the ministry of agriculture, land-use planning and/or environmental protection within the ministry of building, tourism within the ministry of industry, ministry of economy, or even within the ministry of interior, or maritime transport within the ministry of transports, communications, and maritime affairs. Functions important for ICM are sometimes located in nonstandard administrative bodies and agencies. Some are listed in the Annex V. A considerable number of ministries and agencies have subnational or local branches with delegated authority important for ICM. "Local I" and sometimes "Local II" might have considerable authority such as urban planning, issuing building permits, inspection, monitoring, and control.

In some cases, the decision-making processes do not occur according to the institutional arrangement. It

TABLE 6: FUNCTIONAL RESPONSIBILITIES OF THE GOVERNMENT DEPARTMENTS ON DIFFERENT ISSUES

Gov. Departments Issues	Ministry Defense	Hydr. Service	Ministry Me. Mar.	Harbour Office	Ministry Environ.	Ministry P. Works	Ministry Health	USL	Ministry Culture	Ministry Industry	Region	Province	Com.
navigation	R	M	R P	Mg									
fishing			R P	M							P		
ind.&com.harbours			R P	Mg		C			R				
marinas			P	R					R		P		P Mg
water quality			M		R M		R M	M			P R		Mg C
rural urban waste					R		R	M			P	M	C Mg
industrial waste					Mg		R	M					
eutrophication			M	M	P M Mg			M					
coastal erosion					M	P C					P		C Mg
tourism	R		R	Mg					M		P		R Mg
urbanization									M		R P	M	C Mg
parks and reserves			P R		P R Mg						Mg		Mg M
archaeological sites									R		P	R	Mg M
military uses	P R C Mg												
mapping		P Mg M		M									
off-shore activities			R Mg							P R			

Abbreviations of functional responsibilities: P programming R regulation Mg management M monitoring C construction

is not unusual for decision making to be dominated by more influential or more relevant ministries or ministers.

These institutional arrangements establish a large number of administrative and decision-making instances authorized for ICM, a logical consequence of the multiple resources and multiple use of the coastal areas. Under such conditions, decisions sometimes overlap or conflict, and are neither environmentally sound nor meet the requirements of sustainable development. Table 6 is a matrix of functional responsibilities of the government departments in charge of various ICM issues in Italy.

According to some sources, the governmental and other institutional units authorized for various segments of the ICM process, is estimated at 80 in France and more than 50 in Italy. Some have a large number of branches and offices at lower levels.

NONGOVERNMENTAL ORGANIZATIONS (NGO)

In the last 10 years or so, significant improvement has been noted in all Mediterranean countries with regard to NGOs and public involvement in the ICM process. Today, a large number of national, and especially local NGOs, act in the coastal areas, orienting their activities, among others, to the field of ICM. A good example is the NGOs Tunis Declaration on sustainable development, presented in the Ministerial meeting in Tunis, and adopted by representatives of national NGOs from 14 Mediterranean countries. Many of those, especially local NGOs, need help to increase awareness of the problems of coastal ecosystems and resources, as well as the mechanisms and methodologies of ICM.

Within the context of ICM, and particularly with regard to training and education, attention should be paid to a number of Mediterranean NGOs specialized in ICM with good scientific bases and human capacities. They include International Centre for Coastal and Oceans Policy Studies, Genoa (ICCOPS), Eurocoast, Medcoast, and Mediterranean Water Institute (MWI MEDWAN). ICCOPS and MWI have been included in the MAP programme, while Medcoast has been organizing some joint activities with GEF BSEP. The other NGOs specializing in ICM should be given special attention within the context of this Workshop.

UNIVERSITIES

In the Mediterranean region there is no regular university program that would cover, in a systematic way, the most important issues of ICM. However, detailed information on the subject should be found elsewhere. Numerous universities provide high quality courses in biology, chemical engineering, ecology, geography, and other natural sciences, as well as economic and land-use planning, regional planning and development, information systems, computer analysis, and GIS.

Based on numerous contacts while preparing and implementing ICM programs or sectoral activities, it can be said that university scholars involved in those activities showed good and up-to-date knowledge of the concept of sustainable development, and the methodologies, tools, and techniques applied in the ICM process.

This enables the organization of interdisciplinary studies and education in the field of ICM at an integrated basis but, for the moment, probably only at post-

TABLE 7: THE MAIN INSTITUTIONS, SOCIAL GROUPS, AND INDIVIDUALS INVOLVED IN COASTAL MANAGEMENT—THEIR ROLES AND SIGNIFICANCE

				Role and significance*		
Type		Group		Decision-making	Management	Specialized activities
I	Governance, management (individuals, groups, bodies, institutions, authorities)	1.	All levels and forms of governmental and administrative bodies	◆	◆	◆
		2.	Legislative bodies	◆	—	◆
		3.	Judical bodies	◆	—	◆
		4.	Specialized governmental bodies	•	•	◆
II	Private interest groups and institutions	1.	Industry in CZ	◆	◆	◆
		2.	Tourism	•	•	◆
		3.	Maritime transport	•	•	◆
		4.	Energy group	•	•	◆
		5.	Fisheries and fishments	•	•	◆
		6.	Other coast specific groups	•	•	◆
III	Scientific community and universities	1.	Universities	•	—	◆
		2.	Scientific and research institutions	•	—	◆
		3.	Academies of science	•	—	◆
IV	NGOs, environmental or CZ-oriented	1.	Of a general type	•	—	—
		2.	Specialized in CM	•	—	◆
V	General public	1.	At national or subnational level	•	—	
		2.	Coastal population	◆	—	—
VI	International organizations and agencies	1.	UN agencies	•◆	•◆	◆
		2.	Other intergovernmental or international organic	•◆	•◆	◆

* Significance: ♦ =Great, ♦ =Moderate, • = Small, — =Nil

TABLE 8: TRAINING, EDUCATION, AND CAPACITY BUILDING (TECB) IN ICM - PRIORITY GROUPS

Marking according to Table 3	Type	Group	Need for TECB	Need to train the trainers	To provide TECB
I	Governance, institutional management	1. Government and administrative bodies	♦	—	—
		4. Specialized governmental bodies	♦	•	•
II	Private groups	1. Industry in CZ	•	—	—
III	Scientific community	1. Universities	•	•	♦
		2. Research institutes	•	•	♦
IV	NGOs	2. Specialized in CM	—	•	•
V	UN agencies and international organizations	1. UN agencies	—	—	♦
		2. Other organizations	—	—	♦

graduate levels. A harmonized approach to such studies would probably require regional training of lecturers, especially for a number of developing countries, and the largest part of the countries from the Black Sea region.

As far as the university courses on ICM for undergraduates are concerned, these could be more adequately organized within the studies on land-use and regional planning, and economic studies.

POSITION AND ROLE OF INSTITUTIONS AND AUTHORIZED INDIVIDUALS INVOLVED IN COASTAL MANAGEMENT

The positions of ICM practitioners in both regions are numerous and found at various levels. Their roles depend on their hierarchic and sectoral positions, and on the type of function they perform (administrative, regulatory, functional, research, and information). Therefore, it is necessary, from the perspective of training and capacity building, to identify those groups that should be targeted as a priority. Departing from the assumption that as coastal managers we could understand all institutions, social groups, and skilled individuals involved in the use of coastal resources, Table 7 can serve as a basis for such identification.

Attributions to the role and significance of various ICM groups in Table 7 are subject to discussion and amendments. The mentioned ICM groups have various roles and needs in the process of Training, Education, and Capacity Building (the TECB process). The groups which should be included into the TECB process with priority are given in the Table 8. From that table it is possible to conclude:

- The TECB process should be aimed, as a priority, at the institutions and individuals belonging to the governmental structures at all levels and at governmental and paragonovernmental specialized (sectoral) agencies and institutions.
- The second priority should be given to private interest groups.
- Universities, research institutions, and specialized sectorial institutions are potential implementors of TECB, but they also need capacity-building and training of trainers.
- The most significant sources of the TECB process, relevant to ICM, are: UN and other international agencies involved in ICM; universities and research institutes; specialized sectorial agencies; and specialized NGOs, if adequately qualified.

ICM PRACTITIONERS - KNOWLEDGE, SKILLS, AND ATTITUDES NEEDED

The general knowledge required for ICM practitioners in both regions doesn't differ significantly from any other region. That is mostly knowledge relevant to

coastal ecosystems, environment-development interrelations, principles and practice of sustainable development, methodology, tools and practice of the ICM process, assessment and use of coastal resources, principles of governance, administration and management, pollution and emergencies, pollution abatement principles and techniques, principles of environmental economics, database, and information. A number of national- or site-specific issues have to be added to this.

Of the general attitudes needed, it is important to understand and have a positive attitude towards the integrated approach, coordination, and harmonization of decisions and activities, understanding the need for and benefits of the application of the ICM process and the need for cost effectiveness. It is also important to be aware that it is a democratic and market-oriented process. International experts involved in ICM in developing countries need to understand national and local conditions, capabilities, and limitations.

In Mediterranean developing countries, where international cooperation is an important factor in ICM, the knowledge of the major world languages used in the international cooperation is of utmost importance. This is often underestimated in the TECB process.

Departing from this general assumption, the structure and intensity of specialized skills to be secured in the concrete TECB programs depend on the type and group of the targeted ICM practitioners, as well as on the function dominating their role within the ICM process. It can be assumed that the following practical knowledge and skills are needed for most relevant groups. For the individuals involved in governmental and administrative institutions in which the functions of decision making and management are dominant:

- Assessment of values of national coastal resources in development, economic, and financial terms
- Benefits of applying coastal area management programs examples of success and failure of decisions made and projects implemented, transfer of problems and consequences, losses and gains
- Concepts and principles of sustainable development and ICM, methodology of ICM, with particular reference to its integrative and process-oriented character
- ICM tools and techniques, selected, and applicable under specific conditions
- Approach to, development, and implementation of ICM programs and projects;
- Methodology and protection of sectorial ICM within ICM (fisheries and aquaculture, coastal agriculture, forestry, tourism, manufacture, land-use, urban and regional planning, energy, water resources, soil protection)

For professionals involved in specialized ICM-related activities (depending on role and position):

- All the necessary knowledge listed above but in a more general and reduced form, and adapted to the participants' profile
- In-depth and specialized TECB in the relevant specific sector(s), such as integrated water resources management; mapping, monitoring, and management of soil and coastal erosion related phenomena; environmental fisheries and aquaculture management; clean technologies; hazard assessment and risk management; protection and conservation of historic settlements and monuments; identification of areas to be specially protected; environmentally sound energy planning and application of renewable sources of energy; urban liquid and solid waste management; development and management of sustainable tourism; inventory of pollution sources, survey and assessment of pollution; emergency planning and management
- Transfer of specialized intra-sectoral knowledge tools and techniques of environmental assessment, carrying capacity assessment, economic instruments for ICM, conflict resolution techniques, database and information

Universities, research institutions, and specialized NGOs require, in principle, certain capacity building, depending on their involvement in ICM, and their orientation to the provision of TECB to other ICM involved groups. With respect to that orientation, they have mostly specialized needs selected from the list above.

PAP EXPERIENCE IN TRAINING, EDUCATION, AND CAPACITY BUILDING FOR ICM

From 1984 to 1994, the TECB component represented a significant part of the PAP Workplan. Various methods and forms were used in the implementation of that component, gradually developed and improved according to the PAP and Mediterranean experience, and also to the experience of other UN organizations and selected national institutions.

The training component was aimed at selected national and coastal-level decision makers; experts and professionals; capacity building of selected national institutions involved in the implementation of MAP CAMPs (ministries of environment, institutes of regional and urban planning, institutes of informatics, institutions for water resources management). The subjects dealt with in this component were: ICM in general, water resources management, soil protection, energy, historic settlements, tourism, and urban waste management

For the implementation of the TECB component,

PAP's documents, prepared within ICM and sectoral programs were used, but appropriate documents of UNEP, MAP, and other UN agencies and specialized national institutions have also been used occasionally. The authors of the documents were mainly Mediterranean experts engaged in the implementation of the PAP workplan. The documents included national reports, case studies, thematic training documents, exercises prepared on existing or hypothetical Mediterranean examples, guidelines, software, and models. The experience gained in the preparation and use of TECB documents shows at the need to avoid their proliferation. The documents must correspond to the initial level and capacity of the participants, and to the desired level of training results (e.g., advanced-level documents cannot be used for initial phases of training).

TECB was implemented through the following forms: dissemination of selected documents, expert meetings, seminars and workshops, training courses, and "on-the-job" training. The duration of those activities was limited to one week, with the exception of training courses within the MAP ICMs, which were organized in three or four stages within an 18-month period, each phase containing an intensive two to three week training course.

With regard to the results, the significance has to be pointed out of the "on-the-job" training performed within the MAP CAMPs. The prerequisites for the success of the "on-the-job" training program were knowledge of the country's situation and the coastal area, as well as the existing human and institutional capacities of the national professionals and institutions involved, and the level of theoretical knowledge and practical experience in ICM in general, and in specific ICM-related activities (planning, information systems, use of ICM and sectoral tools and techniques).

On that basis, the TECB component has been included in each CAMP project comprised of general knowledge on environmental ecosystems, sustainable development and ICM; in-depth specific knowledge relative to the priority problems of the coastal zone; and the application of selected tools, especially EIA, GIS, and carrying capacity assessment for tourist complexes.

The program of each CAMP project started from a level acceptable for the national team, gradually growing to reach a level corresponding to standard international criteria. The largest part of the program was prepared by the national teams, with international experts providing assistance and guidance. In such a way, the national teams were true authors of the projects, which secured good chances for the implementation of their results, and was also an excellent opportunity for a true on-the-job training.

Seminars and workshops were organized in the traditional way. Documents were submitted to partici-

TABLE 9: SELECTED LIST OF PAP DOCUMENTS USED FOR TECB ACTIVITIES

- A Common Methodological Framework for Integrated Planning and Management in Mediterranean Coastal Areas, 1988
- Guidelines for Integrated Coastal and Marine Areas Management with Special Reference to the Mediterranean Basin, 1994
- Training Programme on Geographic Information Systems, 1992
- GIS - Pilot Application of the Urban Rent Model, 1992
- Economic Instruments and Tools for Coastal Zone Management Applicable in the Mediterranean Countries, 1994
- Analysis of the Application of Economic Instruments in Coastal Management in the Mediterranean region, 1994
- An Approach to Environmental Impact Assessment for Projects Affecting the Coastal and Marine Environment, 1990
- Environmental Impact Assessment: The Marina in Paphos, 1990
- Environmental Impact Assessment for the Split-Stobrec Submarine Sewerage Outfall, 1991
- Environmental Impact Assessment of a Submarine Outfall, 1992
- Database for Water Resources Management
- Use of Aquifer Models in Water Resources Management
- Selected Topics of Water Resources Management
- Application of Integrated Approach to Development, Management and Use of Water Resources, 1994
- Code of Practice for Environmentally Sound Management of Liquid Waste Discharge in the Mediterranean Sea
- A Practical Guide for the Management of Urban Solid Waste in Coastal Mediterranean Countries
- Treatment and Reuse of Municipal Waste Water for Irrigation
- Disposal of Municipal Solid Waste: Sanitary Landfills, 1994
- Guidelines for the Rehabilitation of Mediterranean Historic Settlements, 1994
- Methodological Framework for Assessing Tourism Carrying Capacity in Mediterranean Coastal Zones, 1990
- Study for the Carrying Capacity Assessment of the Central-Eastern Part of the Island of Rhodes, 1993
- Methodological Approach to Erosion Mapping in the Mediterranean Coastal Areas
- Environmental Aspects of Aquaculture Development in the Mediterranean Region, 1987
- An Approach to the Inventory of Sites Suitable for Aquaculture in Mediterranean Coastal Areas, 1990

pants in advance. The participants were selected according to earlier defined criteria using appropriate questionnaires. The participants evaluated the quality of the seminars/workshops/training courses through anonymous questionnaires. In selecting lecturers for national meetings, one or two lecturers were selected from the host-country. The documents covered the concrete national/local examples as much as possible. Field visits and field work were included in the programme.

The programs of sector-related TECB activities, as a rule, had a general part which presented the concept and basis of sustainable development, ICM, and the role of and need for integration of the sectoral activity within the ICM process. As a good basis for advanced-level training, adequate guidelines were used, based on methodologies tested at the regional level.

Experience relevant to the results and cost effectiveness of the various forms of training shows the following:

- With the actions organized at the regional level, including the participants from all or most of the Mediterranean countries, differences in the professional level often appeared, and it was difficult to follow their activities after the training (i.e. establish the corresponding benefits)
- Training organized at the national level enabled a better selection of participants (e.g., governmental institutions, local institutions, or several national institutions with the same professional orientation), better monitoring of their results after the training, and much higher cost effectiveness
- "On-the-job" training enabled work with institutions of considerable importance for ICM, and comparatively good capacity building of those institutions, especially if linked to provision of appropriate equipment, and also satisfactory cost effectiveness
- Training at the regional level showed good results, but only if followed by national TECB activities in

which it was possible to use those trainees as lecturers and trainers

In the last 10 years, PAP organized approximately 70 various TECB oriented activities in almost all of the Mediterranean countries, within a project for seven East African countries, and one training workshop in South America. This component dealt mostly with the following fields:

- Integrated coastal area management, coastal resources management and protection integrated planning, ICM projects
- Integrated water resources management, water conservation programmed WRM models
- Environmental impact assessment
- Application of GIS in ICM
- Carrying capacity assessment for tourist activities
- Mapping and monitoring of rainfall-induced soil erosion
- Conservation and rehabilitation of historic settlements and sites
- Identification, selection and protection of sites suitable for aquaculture activities.

Of the large number of documents prepared for the needs of the TECB component, some can certainly be used in other regions, as well. A selected list of such documents is presented in Table 9.

ANNEX I

THE MEDITERRANEAN BASIN

Meeting point of Europe, Asia, and Africa, a cradle of human civilization

The Mediterranean Sea, almost enclosed, water renewal period 80-90 years, weak tides

21 Mediterranean coastal states - total surface area: 8 million km²; population in 1993: more than 400 million (estimate) - 7 percent of the world's population.

Active plate tectonic processes: divergence of the Arabian-African plates, subduction of the African to the European plates

Climate: Hot and dry summers, mild winters, irregular rainfall pattern, uneven water cycle

Major rivers: Ebro (Spain), Rhone (France), Po (Italy), Nile (Egypt) - deltas

Coastline length: 45,000 km, out of which islands coastline 17,700km

Urbanization on coastline: 540 coastal settlements with more than 10,000 inhabitants, out of which 70 have more than 100,000 inhabitants and 10 with more than 800,000 inhabitants; 65 percent of coastline is urbanized

Mediterranean coastal areas: unique, attractive, specific flora and fauna, natural parks, fragile ecosystems

Development level: great differences (North-South, North-East)

Common Mediterranean culture and history: religions: Catholic, Jewish, Moslem, Orthodox

Limited agricultural resources, agriculture in coastal areas typically Mediterranean.

Forests in decline, covering only 5 percent of the region.

Industry: 16 percent of the world's industry; North—low growth rates, decline of primary production coastal industry; East and South—transfer of technologies, medium and high growth rates

Energy consumption: 0.6 percent billion tons oil (1988); 80 percent in the northern part

International tourism: 33 percent of the world's international tourism; 147 million international visitors in 1990

Maritime transport: 200 million tons of oil annually (30 percent of the world's oil transport), 200-250 large oil tankers permanently in navigation, 60 large ship accidents per year

ANNEX II

Pollution of the Mediterranean Sea from anthropogenic sources

Discharge of pollutants into the sea:

Pollutant	Input (t/year)	
	Atmospheric	Riverine
Pb*	5,000–30,000	2,200–3,500
Zn*	4,000–25,000	11,000–17,000
Cr*	200–1,000	350–1,900
Hg*	20–100	30–150
P	–	320KT***
N	1070 KT**	800 KT***
S	1400 KT**	–
mineral oils	120,000***	
detergents	60,000***	

But:

- the corresponding atmospheric inputs over Europe and the Baltic Sea are approximately twice as large
- although there is relatively good auto-purification properties in the Mediterranean Sea

* GESAMP Reports and Series No. 26

** Meteorological Synthesizing Centre East, Moscow 1993

*** UNEP-MAP

ANNEX III

Basic Elements of MAP CAMP

PAP definition of Integrated Coastal Management (ICM)

- a management process adapted to the conditions in and needs of coastal areas;
- comprehensive, based on rational approach and scientific findings;
- multidisciplinary;
- creates conditions for sustainable development;
- not a substitute for sectorial planning, providing integration of individual resources or sectors management.

Approach: top-down and bottom-up; problem solving rather than problem transferring; prevention rather than cure; precautionary.

Stages: initiation, preparatory, analysis and forecasting, definition of goals and strategies, integration of plans and policies, implementation, and evaluation with feedback; reconsidering after each stage.

Characteristics of the Programme are:

- Conceptual basis: sustainable development, the Genoa Declaration, Agenda 21, the Rio Declaration;
- Methodology: Integrated Coastal and Marine Areas Management (ICM), and integrated planning as a major tool;
- Thematic framework: all MAP activities, concerted and integrated;
- Legal basis: agreements signed with the relevant governments;
- Financing: MAP, national and local authorities involved, The World Bank (Kastela, Albanian coast), The European Investment Bank - METAP (Rhodes - 2nd phase).

Contents of MAP CAMP projects:

1. Implementation of legal instruments (Barcelona Convention, LBSP, Emergency and Dumping Protocols, MARPOL)
2. Individual resource evaluation and management
3. Industrial activities evaluation and trends
4. Mitigation of natural hazards (seismic risk, climate change)
5. Training on and application of: methodology, tools, and techniques of ICM
6. ICM: prospective studies, integrated planning studies, management plans and programmes
7. Final integrated management document

ANNEX IV

The Black Sea - Close to Irreversible Environmental Catastrophe

Surface area: 431,000km², Volume: 555,000km³

Depth: average: 1,179m, maximum: 2,245m

Black Sea coastal states: Bulgaria, Georgia, Rumania, Russia, Turkey, Ukraine, The 5 big rivers:

Belonging to the north-western shelf: Danube (2,860 km l., 817,000km² watershed), Dnjestr (1360km l., 72,000km² w.), Dnjepr (2,285km l., 500,000km² w.)

Belonging to the Azor Sea: Don (1,970km l., 440,000km² w.), Kuban (907km l.) The state of the Black Sea: high input of surface waters; limited exchange of deep waters with the Mediterranean; deep waters anoxic and with H₂S contents below 150m depth; coastal erosion.

Pollution sources: from big rivers, airborne, direct discharge of land-based source pollutants from the coastal zone, shipping, offshore oil and gas exploitation, deballasting oil tankers

Eutrophication: NW shelf, Azor Sea

Introduction of alien species (s.f. *Aurelia aurata*, ctenophore *Mnemiopsis leidyi*). Overfishing (anchovy); decrease of catch 1986: 1992 = 9:1

Tourism - mismanagement, negative impacts of pollution

Climate change: danger from upwelling of anoxic deep-water sea masses

ANNEX V

Examples of specific administrative forms relevant for ICM

Algeria:

- Ministry of Hydraulics and Equipment: including the National Agency for Water Resources (national and local offices); including the Public Works Department (responsibility on harbors and maritime transport)
- Ministry of Interior including the National Office for Tourism
- Ministry of National Defense; including the Coast Guard responsible for the adjacent sea control and protection
- National Planning Council; including the National Agency for Land-Use Planning

Bulgaria:

- Ministry of Regional Development and Reconstruction

Croatia:

- Ministry of Reconstruction and Development
- Ministry of Privatization
- Ministry of Civil Engineering and Land-Use Planning
- State Directorate of Environmental Protection

- State Directorate of the Protection of Cultural and Natural Heritage

Cyprus:

- Ministry of Agriculture and Natural Resources

Italy:

- Ministry of Merchant Marine - Harbour Authority - 12 harbour head officers - 44 local executive branches
- Ministry of Public Health - High Institute of Health - local health authorities
- Ministry of Industry (permits for research and exploitation of gas and oil fields)
- ENI - National Oil Corporation
- ENEL - National Electricity Corporation
- ENEA - National Corporation for New Technologies, Energy and Environment

Malta:

- Water Resources Corporation (para-statal organization)

Tunisia:

- Ministry of Environment; including the National Agency for the Protection of Environment (ANPE)
- National Organization for Sewage Treatment (ONAS)
- National Council for Regional Development
- National Agency for Industrial Development
- Ministry of Agriculture, General Directorate of Soils, General Directorate of Water Resources

Turkey:

- State Planning Organization

Syria:

- General Directorate of Ports (national and local)
- General Directorate of Irrigation in the Coastal Basin (national and regional)
- Ministry of Local Administration (urban and land-use planning - national and regional)
- Ministry of Culture, Directorate of Antiquities and Museums (historic settlements archaeological and cultural reserves and monuments - national and regional)

MEDITERRANEAN AND BLACK SEA: TRAINING AND EDUCATIONAL NEEDS OF ICM PROFESSIONALS—ANALYSIS OF DEMAND

RAPPORTEUR: Erdal Ozhan

CASE PAPER PRESENTATION: A. Pavasovic

Discussants: R. Miller, A. Pavasovic, E. Ozhan, S. Belfiore, L. Hale

DISCUSSION QUESTIONS

- What are the knowledge, skills, and attitudes that make successful coastal managers?
- What types of positions are available for coastal managers and in what institutions (ICM agencies and related-sectoral units)?
- What are the expected changes in the types and quantity of jobs during the next decade?
- What is the demand for coastal managers in the region both quantitatively and qualitatively?
- How do needs vary among nations within the region?

RAPPORTEUR'S REPORT

Arsen Pavasovic presented his discussion paper on the Black Sea and Mediterranean regions, followed by discussion of many of the points he had raised. Some of the major points raised in the discussion are outlined here.

The Mediterranean and Black Sea regions are quite different from one another. Pollution problems in the Black Sea are much worse than in the Mediterranean. The Black Sea is close to an ecological catastrophe. In addition, the institutional and governance arrangements with the countries bordering the two seas are much different. The countries bordering the Black Sea are essentially developing countries.

Coastal Management in the Mediterranean is in the initial stages of development and ongoing, whereas in the Black Sea, it has yet to start. There are, as yet, no regional or national ICM programs. Tunisia and Israel, however, have made the greatest strides along these lines to date. At present, there are no jobs under the title of "coastal manager" in either the Mediterranean or Black Sea as there are no government coastal management programs in these regions.

One point made in the discussions was that it is important to distinguish between integrated resource

management and traditional sectoral management in coastal areas. The tendency has been towards sectoral management. It was also mentioned that there has been discussion about a European Community Coastal Zone Management Initiative which could help catalyze national initiatives, however, this has not happened yet.

Discussants felt that within these two regions, there is a little linkage between international efforts—such as the Mediterranean Action Plan and the World Bank Black Sea initiative—and national efforts. While there has been attention paid to the problems of these two seas from an international and regional perspective, it has not yet translated into substantial actions at the national level. Therefore, it is uncertain what impact these international activities will have in catalyzing national programs. While problems in the academic and research communities are well-recognized and have contributed substantially to the international efforts in the two seas, the government agencies responsible for taking management actions are less aware and concerned. Hence, there is a strong need to develop greater awareness among government personnel and policy makers.

There is training in the region in the sectoral specializations which relate to coastal management and some on-the-job training is occurring. The MedCoast Institute (a regional training initiative of the European Community) is the start of an on-going training initiative in coastal management. At the moment there are no educational degree programs on integrated coastal management in the Mediterranean or Black Sea region. However, a master's program in coastal management is expected to be developed as part of the MedCoast Initiative. It is reasonable to assume that there will be one or two degree programs developed over the next five to ten years. One concern about developing a degree program in coastal management is that, as of now, there are few professional career opportunities as a coastal

· manager since no ICM programs as yet exist. Graduates
 · of such a program may have difficulty finding employ-
 · ment and may need to market themselves with the ca-
 · pability of filling positions that have different job titles
 · other than coastal manager, such as a coastal tourism
 · planner or protected area manager. Such graduates,
 · however, may also be the pioneers that go out and de-
 · velop the national programs needed within the Black
 · Sea and Mediterranean.

THE STATUS OF INTEGRATED COASTAL RESOURCES MANAGEMENT (ICRM) AND DEMAND FOR COASTAL MANAGEMENT PRACTITIONERS IN THE GOVERNMENT SECTOR OF THE PHILIPPINES

Jessica C. Muñoz

Coastal Resources Management Section
Bureau of Fisheries and Aquatic Resources
Quezon City, Philippines

ABSTRACT

The Philippines fisheries are faced with pressing coastal management problems including low productivity, limited use of offshore waters, and resource depletion. To mitigate these problems, several strategies have been created to sustain resource use and promote good management of the coastal zone.

INTRODUCTION

The fisheries sector of the Philippines is faced with the pressing problems that affect the livelihood of about 60 percent of the country's population. The identified problems of the sector are (1) Resource depletion in the coastal zone, (2) Widespread environmental damage, (3) Poverty among municipal fisheries, (4) Low productivity in aquaculture, and (5) Limited utilization of offshore and exclusive economic zone (EEZ) waters by commercial Philippine fishermen.

Recognizing the need for mitigating measures, various government agencies, nongovernment organizations (NGOs), people's organizations, state universities and colleges, and the private sector are undertaking programs, projects, and activities that will lead to the sustainable use of marine and coastal resources.

The Fisheries Sector Program (FSP) of the Department of Agriculture (DA) is a strategy that addresses the pressing problems of the fisheries sector. The Program's objectives are (1) To regenerate coastal resources, rehabilitate the coastal environment, and alleviate poverty among municipal fishermen, particularly through diversification of their sources of income; (2) To intensify aquaculture production, particularly for the benefit of domestic consumption but within the limits of ecological balance; and (3) To help commercial fishermen to move away from overfished nearshore areas to offshore waters. The six components of the Program are Fishery Resource and Ecological Assessment, Coastal Resources Management, Income Diversification, Research and Extension, Law Enforcement, and Infrastructure. There are 12 bays prioritized under FSP.

The Department of Environment and Natural Resources (DENR) is implementing the Coastal Environment Program (CEP) with the following objectives: (1) To promote the use of environmental-friendly coastal technologies, (2) Expand livelihood opportunities in and insure equal access to coastal resources, and (3) Upgrade the capabilities of all DENR personnel in the managing the coastal environment.

The CEP is guided by the principles of equitable and sustainable resource use. The implementing strategies are: (1) Community organizing, (2) Community involvement in the protection and management of coastal ecosystems, (3) Mobilization of financial and administrative resources from the public and private sectors, and (4) Use of contingent approaches in identifying issues, problems, and opportunities for human and environmental welfare.

The objectives of these two big programs are to alleviate poverty among coastal fishermen. Other institutions are also conducting their own coastal resource management activities in various parts of the country, but their programs are on a smaller scale, compared to these two government-initiated projects.

THE COASTAL RESOURCES MANAGEMENT COMPONENT OF FSP

The Coastal Resource Management (CRM) component is considered the core of the Fisheries Sector Program—all activities and projects of other components are geared towards the attainment of the CRM goals. The Program recognizes that integration is key to CRM. An integrated coastal resource management program considers the interactions of people and the environ-

TABLE 1: TOOLS FOR CRM : IMPLEMENTORS

Legislation and law enforcement: Local government units, national agencies, regional offices
Research: National agencies, research institutions, regional offices
Public education: NGO, national institutions, regional offices
Establishment of protected areas: Community, local government units, national agencies, research institutions, regional offices
Zonation schemes: Local government units, research institutions, national agencies, regional offices
Resource regeneration and enhancement: Community, local government officials, research institutions, national agencies, regional offices
Alternative livelihood: NGO, national institutions, local government units, regional offices, banking institutions

ment towards the sustainable use and management of resources, regeneration of depleted resources, and equitable access and use of resources. To realize the goals of the program, strong and capable institutions are required to undertake coastal resources management projects and activities. At the onset of the program, there was an assessment of institutions dealing with fisheries and recommendations to realign these institutions to determine and assign responsibility for the sector. The assessment showed the need to create proper institutional arrangements for the implementation of FSP and that a sound institutional framework must be established for a fisheries administration that sustains the long-term benefits derived from the program.

STRATEGIES OF ICRM

Different strategies are employed when implementing CRM. These strategies may be community participation, government intervention, NGO-participation, and institution-building. The first strategy aims to enhance the participation of the coastal community in decision-making, project implementation, and evaluation. The second emphasizes local and national government in terms of taking the initiative in laying the framework of a CRM program which could border on legislation. The third strategy could be a developmental NGO or an academic/research institution that assists in CRM activities. The fourth involves the creation of an institution for the purpose of undertaking a CRM for an area.

Specific tools are necessary to promote coastal resources management in the country. At present, these tools or approaches (see Table 1) are being undertaken in the 12 bays where FSP is implemented. While most of these tools are implemented at the local level, there is also a need for the national government to provide technical assistance.

THE NEED FOR INSTITUTIONAL STRENGTHENING

Among the agencies involved in the program, (see Table 2), BFAR is responsible for implementing a majority of the components. BFAR, however, and other agencies, for that matter, need institutional reforms to oper-

ate a fisheries administration and management system over the long term. The reforms will make management a permanent feature and ensure a committed delivery of services.

The weakness in the program to implement policy could be rooted in the inadequacy of implementors to fully satisfy the mandate of their assigned tasks. Listed in Table 3 is the profile of field implementors/coastal managers.

The majority have no formal education in coastal resources management. At the national level, everybody holds a degree (B.S.), and only 6 out of a total of 31 technical personnel pursued graduate studies related to CRM.

To equip coastal managers with the proper knowledge, extensive training, workshops, and seminars were conducted at the local and national levels during the first two years that the program was implemented. The training, workshops, and seminars conducted are listed in Table 4.

PROSPECTS FOR COASTAL MANAGERS

While the present situation demands more qualified and capable coastal managers to continue the efforts towards coastal resources management, institutional arrangements offer very little encouragement. Jurisdiction, authority, and legal frameworks are issues that should be worked out so that responsibilities are delineated among agency-implementors.

Certain institutional strengthening strategies recommended in the Fisheries Sector Program, particularly the New Fisheries Code, need to be acted upon. These recommendations entail streamlining and reorganizing agencies to resolve institutional and legal problems.

The Fisheries Sector Program will end in December 1995. The different agencies are mandated to continue the activities and projects of the Program. However, there is also an expected decrease in the number of implementors. It is, therefore, important that proper administrative and organizational mechanisms and arrangements be set in place to lessen the impact of the personnel "drain." By then, sustainability of the integrated coastal resource management program will be ensured.

TABLE 2: ROLES AND RESPONSIBILITIES OF CRM IMPLEMENTORS**Local Government Unit (LGU)**

- Implement policies and decisions regarding Coastal Resource Management (CRM) plan
- Enforce controls related to fishing effort
- Issue necessary licenses in line with its mandate through the Local Government Code of 1991
- Provide data for monitoring the results of fish shelter, artificial reef, and other controls on fishing effort and law enforcement.

Department of Agriculture (DA Regional Office)

- Provide assistance in formulating the framework and methodology to implement CRM activities in coordination with other implementing agencies
- Manage, supervise, and monitor the implementation of activities/projects in the region
- Provide administrative support to ensure effective implementation of CRM projects and activities

Provincial Agriculturist Office (PAO)

- Provide assistance in formulating, implementing, and monitoring the CRM plan
- Prepare work and financial plan
- Manage, supervise, and monitor CRM projects and activities

Municipal Agricultural Office (MAO)

- Provide administrative support for field activities related to CRM
- Monitor results of field activities

Fishermen's Association (FA)

- Participate in CRM planning and plan implementation
- Assist in the enforcement of measures to rehabilitate and regenerate fisheries resources
- Provide data for monitoring

Nongovernmental Organization (NGO)

- Assist in organizing fishing communities through the formation of fishermen's associations
- Assist and provide service for education and training the community on CRM
- Participate in training programs and information campaigns

Bureau of Fisheries and Aquatic Resources (BFAR)

- Assist in conducting rapid resource assessment (RRA) and resource and ecological assessment (REA) for the purpose of gathering data to support management measures
- Assist in the preparation and conduct of appropriate training in the concepts of CRM
- Undertake educational and information dissemination programs on fisheries management to develop and promote sustainability

Department of Environment and Natural Resources (DENR)

- Implement mangrove reforestation project
- Supervise land-based ecological management
- Assist in the formulation of CRM plan

Bay Management Council (BMC)

- Assist in the preparation of CRM plan
- Approve and endorse CRM plan
- Allocate Total Allowable Catch to individual municipalities
- Monitor management measures
- Enforce fishery laws and other relevant fisheries administrative orders
- Assist in educating and training fishing communities on the concepts and principles of CRM.

TABLE 3: EDUCATION OF FIELD IMPLEMENTORS AND COASTAL MANAGERS

Bay Coordinators and PMO Staff (National level)	M.S. Tropical Coast Management M.A. Marine Management M.S. Marine Biology Master's degree in Aquaculture Master's degree in Regional Resources Planning Master's degree in Business Administration Master's degree in Community Development B.S. Fisheries B.S. Marine Biology B.S. Biology A.B. Social Science A.B. Economics A.B. Agricultural Economics B.S. Mathematics B.S. Hotel and Restaurant Management B.A. Communication A.B. Mass Communication B.S. Business Management
Regional and Provincial Fisheries Management Staff (Regional level)	B.S. Fisheries A.B. Economics B.S. Community Development B.S. Biology B.S. Marine Biology Diploma course in Fisheries Master's degree in Business Administration
NGO (Local level)	B.S. Economics B.S. Fisheries B.S. Community Development A.B. Mass Communication B.S. Education
LGU (Local level)	B.S. Economics B.S. Fisheries B.S. Education LLB. in Law B.S. Criminology Doctor of Medicine College Undergraduate
Community	B.S. Education College undergraduate High school Elementary

TABLE 4: TRAINING/WORKSHOPS/SEMINARS

Topic	Participants
1. FSP/CRM Orientation Training/Workshop	I DA Staff II LGUs III NGOs, POs, Fishermen, Community
2. Fish Warden Deputization DA Technical Staff	Barangay Captains, FA Presidents,
3. Artificial Reefs/Fish Shelter Management	DA Technical Staff, LGUs
4. Law Enforcement DA Staff	Fish Wardens, LGUs,
5. CRM Course (Special Course)	Fishing Boat Engineers, Fishermen
6. CRM/Unified Municipal Ordinance	LGUs, DA Staff
7. Credit Appreciation FAs, Cooperatives	DA Staff
8. Value Formation NGOs, Community	DA Staff, LGUs,

REFERENCES

- ACI (Agrodev Canada Inc.) (1989). Fisheries Sector Development Program, Philippines: Final Report. Vol. 1. Asian Development Bank. Manila: Philippines.
- Department of Agriculture. (1994). Fisheries Sector Program (FSP) Credit Component. 38 pp.
- Department of Agriculture. (1993). Fisheries Sector Program. 31 pp.
- Labon, A.L. (1992). Institutional Needs: Assessment of Present Situation and Recommendations. RDA International, Inc. 90 pp.
- Memorandum of Understanding. (1994). Fisheries Sector Program/Loan Nos. 971/972 PHI. 26 pp.
- Muñoz, J.C. (1991). Community-based resource management as an approach for implementing Coastal Resource Management Component of the Fisheries Sector Program (FSP). ERMP Workshop Proceedings. 16 pp.
- Roldan B.R. and Sievert, R.F. (1993). Coastal Resources Management: A Manual for Government Officials and Community Organizers. 40 pp.
- White A.T. & Lopez, N. (1991). Coastal resources management planning and implementation for the Fisheries Sector Program of the Philippines. In O.T. Magoon, H. Converse, V. Tippie, L.T. Tobin & D. Clark (Eds.). *Coastal Zone '91* (pp. 762-775). New York: American Society of Civil Engineers.

ASIA, PACIFIC, AND EAST AFRICA: TRAINING AND EDUCATIONAL NEEDS OF ICM PROFESSIONALS—ANALYSIS OF DEMAND

RAPPORTEURS: Joeli Veitayaki and Robin South

CASE PAPER PRESENTATION: J. Munoz

Discussants: M. Bandara, J. Munoz, J. Veitayaki, R. South, L.M. Chou, S. Boromthananarat, E. Ferrer, D. Sadacharan, E. Gomez, M.A.K. Ngoili, B. Fuller, N. Calumpong

DISCUSSION QUESTIONS

- What types of knowledge, skills, and attitudes make successful coastal managers in the region?
- What types of positions are available for coastal managers and in what institutions (ICM agencies and related sectoral units) within the region?
- What are the expected changes in the quantity and types of jobs over the next decade in the region?
- What is the demand for coastal managers both quantitatively and qualitatively in the region?
- How do needs vary among nations within the region?

RAPPORTEUR'S REPORT

Within this broad region, coastal managers work in many situations ranging from small coastal countries, where there is a high level of concern for coastal issues, to larger countries where, often at senior levels of government, decision makers are remote and not aware of, or concerned about, the coastal area. It was generally felt that there is a lack of integration and dialogue in government which mitigates against multisectoral co-operation.

The group felt that a specific definition of "coastal manager" was not clear and subject to wide interpretation. However, the group identified the following priorities in the analysis of skills, knowledge, and attitudes needed for people working on coastal zone management programs.

Skills:

- The need for management skills especially diplomacy, group dynamics, and negotiation

Knowledge:

- How to put together an interdisciplinary team

Attitudes:

- A need to move away from the sectoral approach
- A willingness to integrate
- Openness to community needs
- An appreciation and love for the coast

With respect to developing appropriate attitudes, a number of strategies were identified:

- Exposure to the coastal community
- Coastal appreciation
- Exchange programs
- Semester-long, in-depth programs
- Public education
- Demonstrating the value of the coastal zone
- Involvement in college (graduate students instructing younger students on coastal topics)
- Provide opportunities for interaction such as parks, museums, places of learning

The group identified the following modes of education:

- Training coastal managers in managerial skills
- Cultivating appreciation through exposure to ICM using
 - a) degree programs with ICM curriculum
 - b) training courses (short term) at the non-degree level for specialists or in-service (on-the-job) training

Attitudinal changes need to be instilled regardless of the mode of education. It was recommended that implementation include:

- In-service training for individuals from different disciplines who need to be trained together
- Integration of coastal management concepts into career and executive training of officials in public administration. Career and executive training is regularly provided for civil servants in many countries such as Sri Lanka, the Philippines, and in East Africa.
- Learning from experts (e.g., management schools)

The group agreed that the needs for training and education in coastal management are considerable throughout the region. However, needs vary at different stages of development of the management programs. In the early stages, the priority is technical skills and planning methodology. In the later stages, more emphasis is needed on how to handle implementation where management skills are very important. Once programs enter the implementation stage, there will be a clearer sense of the specific needs of management. The group also felt that there is a fundamental body of theory on concepts and approaches to coastal management which can be applied and adapted regardless of geographic location.

UNITED STATES, CANADA, AND AUSTRALIA: TRAINING AND EDUCATIONAL NEEDS OF ICM PROFESSIONALS—ANALYSIS OF DEMAND

RAPPORTEUR: Niels West

CASE PAPER PRESENTATION: J. Wiggin

Discussants: K. Brown, J. Wiggin, B. Crawford, W. Matuszeski, M. Wood, N. West

DISCUSSION QUESTIONS

- What are the knowledge, skills, and attitudes that make successful coastal managers?
- What types of positions are available for coastal managers and in what institutions (ICM agencies and related-sectoral units)?
- What are the expected changes in the quantity and types of jobs over the next decade?
- What is the demand for coastal managers both quantitatively and qualitatively in the region?
- How do needs vary among nations within the region?

RAPPORTEUR'S REPORT

Jack Wiggin gave a brief presentation on coastal management programs in Connecticut and Massachusetts. These state programs were created and partially funded through federal government initiatives of both the National Oceanic and Atmospheric Administration (responsible for the administration of the Federal Coastal Zone Management Program) and the Environmental Protection Agency (responsible for the administration of the National Estuary Program). The following table represents the positions and backgrounds of the personnel who staff these state "coastal management" offices.

The group then discussed skill requirements, clients, participants, regional variations, and demand for coastal managers.

Skills. Assuming the dynamic paradigm is correct which hypothesizes an evolutionary movement in coastal management (water quality through traditional Coastal Zone Management (CZM), comprehensive CZM, Integrated Coastal Management (ICM) to Integrated Ecosystem Management), what are the educa-

tional qualifications of the professionals with whom we are charging with the management of our coastal resources?

There was general agreement that the technical background (type of degree) was less important compared to individuals who had a capacity for the "big picture." One member of the group cited the example of the Chesapeake Bay Commission which now includes staff drawn from forestry, soil science, air quality, and fisheries, in addition to professionals drawn from traditional line agencies associated with coastal management such as the U.S. National Park Service and Environmental Protection Agency, all of whom can be considered coastal managers. It was pointed out that many coastal problems, such as excessive nutrient loading and sedimentation in estuaries, are often caused by activities far upstream and are often outside the jurisdiction of the coastal management agency. To address these issues, a broader definition of coastal management is required where specialists, such as foresters and agriculturists, must be included as part of the management team. These specialists may also have to work with the groups causing the problem, which are far from the site of impact. These disciplines, not traditionally associated with coastal management, are becoming important technical areas for coastal managers to understand.

Some general qualifications of coastal managers were identified including the ability to identify and solve problems. Such professionals should be integrators, communicators, and be able to work in a constantly changing environment.

The point was also made that some of the past problems were caused by turning scientists into policy makers with responsibilities of setting management goals. This resulted in many early coastal management programs taking an approach with a heavy research and scientific orientation before turning to actions and

POSITIONS AND BACKGROUNDS OF PERSONNEL IN STATE "COASTAL MANAGEMENT" AGENCIES

Connecticut Office of Long Island Sound Programs

Director

Assistant Director

Coastal Program Section

7 Municipal Planners

M.S. Urban and Regional Planning

Permit and Enforcement Section

Benthic Biologist

Benthic Ecologist

Biologist

Marine Biologist

Technical Assistance Section

Biologist/Ecologist

Geologist

Biologist

Planner

Others

Public Involvement Specialists

2 Legal Specialists

Massachusetts Coastal Zone Management Program

Director

Management and Administration

Assistant Director

M.S. Resource Economics

Grants Management Specialist

Administrative Assistants

Technical Support

Public Outreach Coordinator

M.A. Environmental and Resource Policy

Harbor Management Coordinator

M.A. Philosophy

5 Regional Coordinators

M.S. Science Communication

MPA Environmental Administration

M.S. Environmental

Data Manager

M.A. Marine Affairs

Permit Advisory Specialist

(Dredging Coordinator)

B.S. Environmental Sciences

Graphic Designer

B.F.A.

Technical Support

Nonpoint Source Coordinator

M.S. Environmental Engineering

Assistant NPS Coordinator

M.A. Environmental Policy

2 Coastal Geologists

M.S. Geology

M.A. Physical Geography

Tidelands Coordinator

Ph.D. Environmental Policy

Environmental Analyst

M.A. Marine Affairs

Project Review Coordinator

Federal Consistency

M.S. Environmental Sciences

Water Quality Planner

M.A. Environmental Science

Legal counsel

J.D.

Environmental Planner

B.S. Zoology

Massachusetts National Estuary Program

Massachusetts Bays Program

Executive Director

Ph.D. Marine Environmental Science

Director of Public Outreach

B.S. Natural Resources

Data Manager

M.S. Geology

Public Information Specialist

B.S. Communications

Administrative Assistant

B.A.

Buzzards Bay Project

Executive Director

Ph.D. Marine Policy

Toxic Reduction Specialist

M.S. Business Administration

Environmental Planner

M.S. Environmental Science

policies to address specific problems. Several members on the committee suggested an alternate science/policy model where scientists are encouraged to collect data that would be useful to policy makers for setting policy. However, in this model, it is the policy makers and managers who ask for research and scientific information to better address and understand identified issues. There is also a need to develop reliability checks on scientific data, here referred to as comfort indices, analogous to statistical confidence levels. Coastal managers need to understand that no level of information, science, or research will necessarily answer all the questions of a manager or policy maker. A level of uncertainty will always exist, and decisions need to be made within that context.

Finally, members of the group recognized that there is an absence of clear and easily definable coastal jurisdictions. The absence of such jurisdictions often lead to turf battles resulting in, at best, inefficiency of scarce natural, human, and financial resources and, at worst, to the total disintegration of any ICM efforts.

Clients and Participants. The evolution of the demand for coastal managers initially centered on the experience of the United States. In the U.S., most of the coastal management graduates found employment within the federal sector. Since then, largely influenced by a trend towards decentralization of federal initiatives, states have been encouraged to become responsible for a greater proportion of the coastal management effort. Thus, coastal management jobs have been recently identified within state and local communities. These jobs are increasingly required to implement local coastal management initiatives.

Everyone agreed that efforts should be made to involve the private sector since many industries were contributing to the problems of the coastal zone. Agriculture significantly contributes to nutrient overloading in many estuaries here and abroad. The need to involve this sector was noted in particular.

Other organizations that are using coastal managers more include the NGO community and international donor agencies. The absence of any real knowledge about the unique problems encountered in the coastal zone among many professionals in the private sector, environmental NGO community, and donor agencies was repeatedly cited as detrimental to effective coastal management.

Brief mention was made of the experiences in Australia where most of the graduates from that country's only academic unit offering degrees in coastal management find employment primarily within the local and state governments. The private sector is expected to employ future coastal managers as part of the legal requirement to employ "environmental managers." As much industrial and urban development is coastal,

there appears to be good prospects for "coastal managers" in the private sector. It was noted that a real discrepancy exists between the national and state demand, on one hand, and the private sector, on the other. Again, the often confusing relationship between national involvement in coastal management, the states involvement (or lack thereof), and local jurisdiction has been a real detriment to implementing comprehensive coastal management in Australia.

Regional Variation. The group spent some time reviewing recent trends and political events in the United States, Canada, and Australia. All three countries have moved towards decentralization and deregulation. The recent U.S. elections pose a hard-to-define impact on coastal and other environmental programs. The consensus was that, on the national level, there would be less emphasis on coastal management, less regulations (and thus fewer regulators), and greater emphasis on professionals able to work on consensus building, voluntary measures, and integration of existing agency and program activities.

In Australia, the outlook for coastal management was cloudy in part because of the confusion related to governmental jurisdiction. It was noted that the federal government had jurisdiction seaward of mean high water, but that states had jurisdiction over certain coastal fisheries. Furthermore, there is some evidence that the national government is attempting to bypass the involvement of states in coastal management by offering funds directly to the local jurisdictions. These developments sometimes result in rifts and inefficiency.

In Canada, the situation is somewhat different. Most of the federal coastal management efforts take the form of site-specific projects such as the Fraser River in British Columbia and the St. Lawrence River in Ontario and Quebec. Some provinces (New Brunswick and Nova Scotia) have drafted coastal management policies (as in Australia) which have not yet been implemented largely because of lack of federal financial support or resolution of Federal and Provincial arguments concerning jurisdiction and authority. It was also noted that Canada supports substantial international development assistance efforts concentrating on coastal management in the Caribbean and the Pacific where Canada has had a long and continued development assistance presence.

Demand. The group was unable to come up with specific quantitative estimates of current and future demands except we agreed that there would be a smaller demand for traditionally trained coastal managers and a greater demand for professionals with diverse backgrounds.

TRAINING AND EDUCATIONAL NEEDS OF ICM PROFESSIONALS— ANALYSIS OF DEMAND

PLENARY DISCUSSION

RAPPORTEUR: Kenneth Brown

DISCUSSION QUESTIONS

- How do needs vary at different stages of development in a coastal management program?
- Who are the clients of ICM education and training programs?
- Who are the participants of ICM education and training programs?
- What are the critical components, given the needs, of an ideal ICM curriculum?
- Is there a core curriculum of fundamental concepts and approaches regardless of geographic location?

RAPPORTEUR'S REPORT

There was general recognition of the different needs driving a ICM program as a process. The needs of well-developed nations like the United States, were quite different than those of less-developed countries or other countries, like Australia and Canada. These countries, while aware of coastal management, remain in a holding pattern.

Nevertheless, perhaps we can see a transitory phase. In the United States, a mature, federally funded program has been in place for at least 20 years. In this period, we have moved from a clear regulatory process to a more conciliatory process involving local communities. Chesapeake Bay is an example where the program has been broadened, so that it is not just concerned with water quality, fisheries management, and nutrient management, but it now includes air management which affects nutrient management over a much greater area (i.e., the air catchment area is much greater than the water catchment *per se*). Again, we can all learn from the years of experience in the United States. We do not have to be sidetracked or shunted off by doughnuts, cables, or general practitioners. What is needed for a variety of problems is, first of all, recognition of the problem.

The problems may range from a simple lack of understanding, the need for a flexible approach, or even

“retooling” officials and/or existing programs. Solutions are needed which could be adopted by communities, scientists, resource managers, academics, and government.

In many instances, the basic skills are lacking to deal with the simple problem without looking at the broader picture. Governments often need solutions that yield the necessary short-term benefits as stepping stones or a ramp to the broader picture benefits—the pebble in the pond and the ripple effect—that can be immediately generated. For example, coastal erosion in Sri Lanka was an obvious, immediate problem as was coastal inundation in Bangladesh, which requires different solutions, different costs, and even different results. These were primary issues that affected people rather than environments. It is people-related issues that governments respond to immediately, followed by resource protection, exploitation, and management. In more developed countries, these are not normally the problems. More aesthetic and seemingly inconsequential issues like recreation, tourism, and environmental quality are the focus.

It was suggested that in training educators, teams can be concentrated (in hindsight) to work on total catchment or watershed issues which include health and food, fisheries, erosion, and other issues. Initial training can provide the foundation of knowledge, and demonstration projects can provide the necessary experience. Nothing breeds success like success.

This team approach, of course, requires the honesty and respect of all participants. As practitioners, perhaps, they should be housed in one building or center so, almost by default, they can exchange ideas and talk to each other. Perhaps government bureaucracies need to be dismantled and restructured as do the traditional disciplines in academic institutions which generate and promote a narrow approach.

Ultimately, before deciding on any course of action, the importance of seeking goals must not be undervalued. It is important for the users/recipients to express those goals to funders—agencies and donors. Too often

donors “tell” rather than “advise or suggest”. It is the responsibility of donors to at least listen to and respect the backgrounds of the recipients. They must do so in their own countries, why not a thousand kilometers away? This approach helps build trust, respect, and a team spirit to tackle a problem. This may involve conflict resolution techniques, teamwork skills, a variety of additional training skills, and a genuine need for open and honest discussion—“talk amongst equals”—before there is an acceptable climate to receive that information (the transfer of information). When necessary, other “experts” may be drawn in to facilitate or supplement the team. Too often development assistance does not include a sustained training component. Rather, it offers a quick fix that looks great but does not last (e.g., in mangroves and golf courses, canceled programs in the South Pacific).

It was recognized that teams are led and that part of the role of the leader is to “glue” the units together. Perhaps leadership is the role of a coastal manager. One perspective is that what we are really talking about in ecosystem management is that coastal management is one of many specialized ecosystems in need of management. In either case, it is important to concentrate on a slightly broader field of issues so that fisheries management and other traditional sectors are included. Many indicated that it has taken too long to have coastal zone management recognized in its own right, and it would not be appropriate to confuse the issues now, by redefining the “discipline or profession” as ecosystem management.

The university with networks within and/or without may be the provider of “the grease,” the electricity which powers the coastal zone dynamo. If they cannot provide the “general driver” (perhaps to mix metaphors), then they could at least provide the chief-of-staff who can organize the numbers, the budget person, and the organization—allowing the “general driver” to inspire and lead the team.

Who are the practitioners? They are the local community in many instances. Certainly they must see the value, the return for managing the coastal zone. Otherwise, why bother? Hence an important skill of the coastal zone manager is communication at all levels of the community, with government officials, and in academia. Again, honesty and respect dominate as well as a willingness to advance. The trainer-manager also learns. The value of partnerships was emphasized—partnerships between universities, networks, and users. Future and current coastal management managers need to be ethical in approaching coastal zone problems and solutions. In summary, coastal zone management was seen as a partnership where honesty, respect, and reality underpin the overall partnerships between communities, universities, networks, and government.

SECTION 2

COASTAL MANAGEMENT TRAINING AND DEGREE PROGRAMS: STATUS AND TRENDS

Status and Trends in Coastal Management-Related Training Courses in the EPOMEX Program, Mexico: Structure, Projection, Curricula, and Institutional Arrangement <i>Alejandro Yanez-Arancibia, Ana Laura Lara-Dominguez</i>	45
Status and Trends in Coastal Management-Related Training and Degree Programs in Southeast Asia <i>L.M. Chou</i>	49
Training for Integrated Coastal Management: A Review of Trends, Issues, and Approaches for the 21st Century <i>Brian Crawford</i>	54
Capacity Building at a Graduate Level Educational Program in Coastal Zone Management: A Case Study of the Autonomous University of Baja California, Ensenada Campus, Mexico <i>Jose Luis Ferman-Almada, Lorenzo Gomez-Morin Fuentes, Ileana Espejel Carbajal, David Fischer</i>	62
Interdisciplinary Education with Consideration for Coastal Management <i>Elizabeth Fuller</i>	68
Meeting the Challenge: The Marine Studies Programme at the University of the South Pacific <i>G. Robin South, Joeli Veitayaki</i>	73
Coastal Management and Marine Affairs Educational Programs <i>Niels West</i>	79
Medcoast Institute: A Training Program on Coastal Zone Management in the Mediterranean and the Black Sea <i>Erdal Ozhan, E.B. Culhaoglu</i>	84
Rapporteur's Report Coastal Management Training and Degree Programs: Status and Trends	89

STATUS AND TRENDS IN COASTAL MANAGEMENT-RELATED TRAINING COURSES IN THE EPOMEX PROGRAM, MEXICO: STRUCTURE, PROJECTION, CURRICULA, AND INSTITUTIONAL ARRANGEMENT

Alejandro Yanez-Arancibia and

Ana Laura Lara-Dominguez

Program of Ecology, Fisheries and Oceanography of
the Gulf of Mexico (EPOMEX Program)
Universidad Autonoma de Campeche
Campeche, Mexico

ABSTRACT

The Universidad Autonoma de Campeche in Mexico created the EPOMEX Program in 1990 to address coastal management issues. The program began with a series of short courses, called International Diploma Courses, that concentrated on managing coastal ecosystems. The courses were designed to enable advanced students, investigators, and resource managers to obtain specialized training in a wide range of related disciplines. EPOMEX is considering creating an International Center for the study and management of tropical coastal resources.

INTRODUCTION

The EPOMEX Program was created in 1990 with three principal objectives. The first was to develop knowledge in the areas of ecology and management of coastal ecosystems, tropical fisheries resources, pollution and environmental impact, and coastal and oceanographic processes. The second was to strengthen higher education, and the third was to publish and disseminate the results of academic activities.

Beginning in 1992, a series of International Diploma Courses was initiated. They were designed as advanced short courses for a higher academic level and oriented to the management of coastal ecosystems. The courses were given in English for international students, or in Spanish for advanced Mexican students. This option was considered the most rapid and efficient mechanism to strengthen students who required highly specialized courses.

The topics covered in these courses are key to understanding ecological economics, coastal processes, environmental impacts, tropical fisheries, and analyzing ecosystems. In all cases, the courses are oriented towards the management of tropical coastal ecosystems.

The structure of the courses offers an alternative for students to gain information in their areas of specialization. Postgraduate programs from public or private universities in Mexico and other countries, interested in strengthening their personnel, are offered an opportunity by the Campeche University and the EPOMEX Program to diversify their course offerings and strengthen their graduate programs. The geographic location of the University of Campeche in southeast Mexico, with Campeche Sound and adjacent coastal systems, makes it an ideal place of study for those interested in the Gulf of Mexico and other coastal areas of the Caribbean and Latin America. Because of the broad significance of the course topics and the nature of the course presentations, the EPOMEX Program is considering the possibility of creating, within the framework of its activities, an International Center for the study and management of tropical coastal resources.

OBJECTIVES

The objective of the courses is to enable advanced students, investigators, natural resources managers, and decision makers to obtain specialized training for

scientific study, teaching, and management. The International Diploma Courses cover a wide range of related disciplines in order to achieve sustainable management of coastal ecosystems. The courses not only introduce students to new techniques and methods but also show how these can be applied to the solution of practical problems in their home regions.

STRUCTURE

The mechanics of the courses are very diverse. They include lectures, practical exercises, case studies, field work, and seminars. The length of each course averages three weeks with the following schedule: February (Ecology and Management in Tropical Estuaries), May (Remote Sensing and Geographic Information System Applied to Coastal Processes), August (Pollution and Environmental Impact in Tropical Coasts), and October (Tropical Fisheries Resources: Ecology, Population Dynamics, and Modeling).

PROJECTION

From 1992 until 1994 the courses have been offered 11 times with an enrollment of 115 students from 46 institutions in 13 countries. The courses were taught by 29 professors from 18 institutions. The chronology of the courses is given in Table 1.

CURRICULA OF THE COURSE ON ECOLOGY AND MANAGEMENT IN TROPICAL ESTUARIES: A CASE STUDY

An integrated understanding of ecology is essential for biotic resource and habitat management. This is the focus of this course, which emphasizes understanding of the structure and function of tropical estuarine systems. It stresses the ecological interdependence between saline wetlands, freshwater swamps, coastal lagoons, and adjacent shelf waters. Physical, chemical, and biological processes link these habitats and modulate the dynamics of the biological communities. Ecological research oriented towards natural resource management requires an understanding of these processes in order to understand problems facing the fishing sector, the oil industry, coastal agriculture, urban and industrial development, and associated environmental responses. Furthermore, ecological investigations oriented towards management should be done from a multiple-use approach.

This course presents theoretical, conceptual, and methodological approaches to managing tropical estuaries. It features conservation and sustainable management of the ecosystem; optimal resource utilization; resolution of conflicting uses; environmental, social, economic, and political considerations; and encourages formulation of rational and fair resource policies with the joint participation of policy makers with coastal non-governmental organizations.

The general topics covered are the following:

- **Introduction to Estuaries:** Coastal management, ecosystem modeling, plankton community dynamics, functional groups, nutrient uptake and cycling, trophic interactions, grazing and the microbial loop, metabolic budgets, and management issues (eutrophication, toxic contaminants, turbidity).
- **Benthic Community Dynamics:** Functional groups, animal/sediment interactions, feeding types, sediment nutrient cycling, management issues (eutrophication, oxygen depletion, toxic contaminant, dredging).
- **Seagrasses and Macroalgae:** Functional groups, light, and photosynthesis depth distribution, nutrient uptake, relation to higher trophic levels, management issues (macroalgal outbreaks, epiphyte overgrowth, phytoplankton shading, toxic contaminants, herbicides, metals, dredging, and turbidity).
- **Ecosystem Management Modeling:** Concepts of model development, examples.
- **Practical Field Training:** Intensive field exercises in Laguna de Terminos and adjacent areas.
- **Case Studies:** Shrimp farms, urban expansion, human impacts in the Mississippi Delta, global change, sea level rise and its importance for coastal systems, use of models in coastal management, coastal impoundments, physical changes in coastal systems and direct changes in the biotic structure of coastal systems, and management concepts for coastal biotic reserves.

As part of the course, there are several field exercises to the Terminos Lagoon estuarine system, where students obtain practical training. The students present seminars and reports from the results obtained. An abstract of the most relevant information is published in *Jaina*, the newsletter of the EPOMEX Program (see references).

INSTITUTIONAL ARRANGEMENTS

The International Diploma course has been recognized by the seven most important postgraduate programs in Marine Sciences in Mexico. On April 30, 1992, an agreement was signed which recognizes EPOMEX courses as valid at the following institutions: Centro de Investigacion Cientifica y de Educacion Superior de Ensenada, Centro Interdisciplinario de Ciencias de Mar, Universidad Autonoma de Baja California, Instituto Tecnologico de Estudios Superiores de Monterrey Guaymas, Unidad Academica de los Ciclos Profesional y Posgrado del Colegio de Ciencias y Humanidades /Universidad Nacional Autonoma de Mexico, Escuela Nacional de Ciencias Biologicas del Instituto Politecnico Nacional, and Centro de

TABLE 1: THE CHRONOLOGY OF THE COURSE OFFERINGS BY EPOMEX PROGRAM

Course	Month / Year	Professor / Institution	No. students
Ecological Economics in Tropical Coastal Ecosystem	February 1992	Dr. Max Aguero Negrete / ICLARM-CEPAL Dr. Edward Barbier / London Environmental Economics Centre Dr. Robert Costanza / Maryland International Institute for Ecological Economics, Univ. of Maryland Dr. Juan Carlos Seijo / CINVESTAV - Merida	20
Tropical Coastal Oceanography	May /1992	Dr. Bjorn Kerfve / Dep. Geology Belle W. Baruch Institute for Marine Biology and Coastal Research, Univ. SC Dr. David Salas de León / ICML-UNAM Dra. Adela Monreal Gómez / ICML-UNAM	4
Advances in Estuarine Ecology	August /1992	Dr. Michael W. Kemp / Center for Environmental and Estuarine Studies, Univ. of Maryland Dr. Christopher J. Madden / Center for Environmental and Estuarine Studies, Univ. of Maryland Dr. Robert R. Twilley / Univ. Southwestern Louisiana Dr. Alejandro Yáñez-Arancibia / EPOMEX Program	10
Analysis and Modeling of Artisanal Fisheries	November /1992	Dr. Francisco Arreguin Sánchez / CINVESTAV - Merida Dr. John Caddy / Fishery Department FAO Dr. Domingo Flores Hernandez / EPOMEX Program Dr. Daniel Pauly / ICLARM Dr. Jon Sutin / Univ. Rhode Island	21
Remote Sensing and Geographic Information System in Coastal Processes	April - May /1993	Dr. Bjorn Kerfve / Dep. Geology Belle W. Baruch Institute for Marine Biology and Coastal Research, Univ. SC Dr. Erick Wolanski / Australian Institute of Marine Science	5
Ecology and Management in Tropical Estuaries	August /1993	Dr. Michael W. Kemp / Center for Environmental and Estuarine Studies, Univ. of Maryland	14
	February /1994	Dr. Christopher J. Madden / Center for Environmental and Estuarine Studies, Univ. of Maryland Dr. John W. Day / Dept. Oceanography and Coastal Science, LSU Dr. Robert R. Twilley / Univ. Southwestern Louisiana Dr. Enrique Reyes Gómez / Maryland International Institute for Ecological Economics, Univ. of Maryland Dr. Alejandro Yáñez-Arancibia / EPOMEX Program M. Sc. Ana Laura Lara-Domínguez / EPOMEX Program	3
Tropical Fisheries Resources: Recruitment Processes	October /1993	Dr. Daniel Pauly / ICLARM Dr. Richard F. Shaw / Dept. Oceanography and Coastal Science, LSU Dr. Francisco Arreguin Sanchez / EPOMEX Program Dr. Domingo Flores Hernandez / EPOMEX Program M. Sc. Patricia Sanchez-Gil / EPOMEX Program	11
Remote Sensing and Geographic Information System Applied to Coastal Processes	May /1994	Dr. Bjorn Kerfve / Dep. Geology Belle W. Baruch Institute for Marine Biology and Coastal Research, Univ. SC Dr. Anthony J. Lewis / Dept. Geography and Anthropology, LSU Dr. Mario Arturo Orte / Geography Institute, UNAM	9
Pollution and Environmental Impact in Tropical Coasts	August /1994	Dr. Gerardo Gold Bouchot / CINVESTAV - Mérida M.Sc. Jorge A. Benítez Torres / EPOMEX Program M. Sc. David Zárate Lomell / EPOMEX Program QFB Cristina Barcenás / EPOMEX Program	7
Tropical Fisheries Resources: Ecology, Population Dynamics and Modeling	October /1994	Dr. Daniel Pauly / ICLARM Dr. Nelson M. Ehrhardt / RSMAS, U. Miami Dr. Richard F. Shaw / Dept. Oceanography and Coastal Science, LSU Dr. Jan Beyer / FAO-DANIDA Project Dr. Francisco Arreguin Sánchez / EPOMEX Program Dr. Domingo Flores Hernandez / EPOMEX Program M. Sc. Patricia Sánchez-Gil / EPOMEX Program	11

Investigaciones y de Estudios Avanzados-Merida. In addition, we have signed agreements with three foreign institutions whose students can obtain credit for the EPOMEX courses: Louisiana State University (Department of Oceanography and Coastal Science), University of South Carolina (Belle W. Baruch Institute for Marine Biology and Coastal Research), and the University of Maryland System (Center for Environmental and Estuarine Studies). These agreements reinforce existing academic interchanges and cooperative research programs.

THE FUTURE

The diploma courses form the basis for a future program for an international doctorate degree in coastal tropical ecosystems. This is the main goal for the coming year which will consist of the implementation of a postgraduate program in the tropical Americas. We will propose a Doctorate in Tropical Coastal Ecosystems with specializations in ecology and management of coastal ecosystems, contamination, and environmental processes. This will be an international doctorate with the participation of visiting professors of international repute from institutions in Mexico and other areas of North America, Europe, Latin America, Southeast Asia, and Australia. In order to facilitate the objectives of the Doctorate Program, we are conducting a feasibility study on the creation within EPOMEX of a Regional Center for Tropical Coastal Ecosystems.

REFERENCES

- Barcenas, C., Barreto, M.B., Lamparelli, C.C., Ivanova, L., Marin, B., de Moura, D.O., Palomares, R., Ramos, J., Rivera, E., Santos, A. (1992). Ecologia estuarina experimental en la Laguna de Terminos, Mexico. *Jaina*, 3(3), 18-19.
- Barcenas, C., Contreras, R., Coronado, C., Garcia, J., Hernandez, M., Iglesias, C., Martinez, M., Murillo, M., Pineda, A., Puente, R., Rivera, E., Rodriguez, G., Velazquez, T., Zarate, D. (1993). Curso de Ecologia y Manejo de Estuarios Tropicales. *Jaina*, 4(3), 14-15.
- Felix-Pico, E.F., Mancera-Pineda, J.E., McNally, D.P. (1994). Aspectos de produccion primaria en Estero Pargo, Laguna de Terminos. *Jaina*, 5(1), 4-5.

STATUS AND TRENDS IN COASTAL MANAGEMENT-RELATED TRAINING AND DEGREE PROGRAMS IN SOUTHEAST ASIA

L.M. Chou

Department of Zoology
National University of Singapore
Singapore

ABSTRACT

Utilization of coastal areas in Southeast Asia has intensified significantly in recent decades. Growing population pressure, large-scale exploitation, and rapid development of infrastructure have resulted in severe environmental degradation and a decline in the quality of the coastal environment. Integrated management of the coastal area is advocated as a means to minimize such impacts and support achievement of sustainable development. What is lacking is a training component that provides coastal zone managers with enhanced capabilities to deal with interdisciplinary issues and multisectoral planning. Many of the region's tertiary institutions have yet to provide a degree course in integrated coastal zone management, although they are active in conducting short-term training courses not only for practitioners but also for different sectors of the community. The current emphasis is to train managers of today, while recognizing that the long-term solution remains in training managers of tomorrow. However, many trainers are not in the best position to conduct formal or informal training courses on their own as they have been trained in specific disciplines and lack an essential understanding of issues and processes beyond their fields of expertise. Proposed curricula of integrated coastal zone management degree programs require institutions to recognize the need to vary administrative structures so that staff from different faculties may offer courses that are fully multidisciplinary.

INTRODUCTION

The coastal environment features prominently in Southeast Asia. As in most countries, a high percentage of the population is concentrated in the coastal area. Expanding population and rapid coastal development have placed increasing pressures on coastal resources, resulting in habitat destruction, marine pollution, and diminished resources (Chou, 1994a; Chua & Garces, 1994; Hay et. al., 1994). Integrated coastal management (ICM) has been recognized as an effective strategy to provide a broad, anticipatory, management-based approach, compared to the reactive and problem-driven sectoral approach. With development, loss of environmental assets cannot be totally avoided, but they can be effectively minimized with appropriate planning and management. The traditional sectoral planning and management approach has been unsuc-

cessful because of the multidisciplinary nature of coastal management issues (Scura et al., 1992). Integration and coordination are important considerations for effective management. Since ICM requires an integrated, multidisciplinary approach, it will also require appropriately trained personnel. This is an important area in which the region's tertiary institutions can play a positive role (Chou, 1994b). Equally important is to allot as much time as it takes for this region to acquire sufficient numbers of ICM-trained personnel.

At the 1990 Association of Southeastern Asian Nations (ASEAN)-U.S. Workshop on Coastal Area Management Education in the ASEAN region, it was agreed that trained manpower in integrated coastal zone management is not adequately provided by educational institutions in the ASEAN region (Chua, 1991). While effective coastal area management can be best achieved

through development and implementation of integrated programs, the management capabilities of governmental and nongovernmental organizations responsible for coastal area management need to be strengthened. The public also needs to be made aware of its critical dependence on the continued productivity of coastal resources through nonformal programs. Professional and technical support staff of agencies must receive formal training in coastal management in order to deal efficiently with issues and problems and to develop effective strategies. They must learn about coastal resources as well as environmental, social, cultural, and economic systems. They must also have an understanding of present and future environmental problems and how they are solved with an integrated management approach.

TRAINING NEEDS IN COASTAL ZONE MANAGEMENT

A 1986 UNEP survey shows that many tertiary institutions within the Asia-Pacific region have incorporated environmental education as either part of a discipline such as engineering, biology, earth sciences, and law, or as an independent degree program. A few examples of independent degree programs include environmental studies in Indonesia and environmental engineering at the Asian Institute of Technology in Thailand. The survey also revealed that education and training in environmental issues tend to be oriented towards general degree programs rather than specialist training because there is a shortage of employment opportunities for the latter in the region (ESCAP, 1992).

In assessing the training needs in coastal zone management for the region, McManus (1993) stressed that both long-term and short-term training is necessary. Degree programs provide a pool of professionally trained managers and coordinators of integrated coastal zone management initiatives. In Southeast Asia, most ICM practitioners begin with a degree in a related discipline and, therefore, require short-term training in ICM while on the job.

Chou (1994b) and Hay et al. (1994) point out that along with the need to train ICM practitioners, there is also a need to train those who are responsible for educating and training. The immediate training needs in ICM for Southeast Asia include the following categories:

1. Formal degree programs to train future managers
2. Non-formal short-term programs for present-day managers
3. Programs for present-day educators
4. Programs for different user groups such as policy makers, developers, the public, and coastal communities

The observation by Crawford and West (1993) that the major gap in integrated coastal zone management training is the lack of professionals with interdisciplinary views and experiences applies completely to this region. Kenchington (1993) stresses the importance of training educators, managers, and the public.

The ASEAN-U.S. Coastal Resources Management project invested many resources to develop manpower in order to upgrade national and local capabilities in ICM. Short-term training courses were organized for Project personnel while a few younger project staff were selected for master's degree programs in the United States in relevant fields of coastal and marine resource management (Scura et al., 1992). A survey conducted towards the end of the training phase concluded that among the 118 ASEAN nationals involved, 68 percent were in jobs for which they were trained, 93 percent considered their training relevant, and almost 30 percent had increased levels of responsibility (Dalusung, 1992).

Trainers from tertiary institutions who are expected to conduct ICM courses often lack the multidisciplinary background for courses they are to handle single-handedly. Coastal zone management is being taught in different faculties as part of a broader environmental science program and maintains a strong discipline bias. Many trainers in the region have been trained in separate disciplines and lack a proper understanding of issues and processes beyond their fields of expertise.

STATUS OF COASTAL ZONE MANAGEMENT TRAINING

The 1993 survey of the region's institutions carried out by UNEP's Network for Environmental Training at Tertiary Level in Asia and the Pacific (NETTLAP) showed that the various courses that are being taught cover a broad range of marine environment-related topics. Most of these courses are given as part of a broader environmental science degree. Some universities offer further specialized courses at the master's level, but, to date, few institutions in Southeast Asia are offering a basic or higher degree course in ICM. Many of the institutions have indicated the intention to introduce a specialized master's program in ICM in the near future in order to train personnel to handle what is recognized as a growing environmental problem. The situation remained unchanged when assessed at a regional intergovernmental meeting at the end of 1993 (Hay & Pradhan, 1993).

While increasing attention on the region's coastal zone management problems is evident from the growing number of research projects, conferences/meetings, and short training courses involving researchers and policy makers, a gap remains in terms of a structured degree program in ICM. The demand to integrate envi-

ronmental issues into development and decision-making is resulting in an increase of the type of short-term professional and in-service training courses found in tertiary education.

NONFORMAL TRAINING

The University of Rhode Island (U.S.) has established a Coastal Resources Centre in Sri Lanka and is organizing short-term training courses in Integrated Coastal Zone Management in collaboration with two institutions in Southeast Asia—the Prince of Songkla University in Thailand and Silliman University of the Philippines (Crawford et al., 1993).

The newly established International Tropical Marine Resource Centre, a consortium comprised of the Great Barrier Reef Marine Park Authority, James Cook University, and the Australian Institute of Marine Science, conducted a three-week training course entitled “Management of Marine Ecosystems and Their Uses” for scientists and managers of the region. The course, conducted in Malaysia in September 1993, is being followed by in-country training courses in Indonesia, Mauritius, Papua New Guinea, Thailand, and Vietnam.

A regional report indicated that short-term training courses at the national level are not lacking (Hay & Chou, 1993). Many programs have been developed and packaged for different target groups. These short-term training courses are useful as stop-gap measures to raise the level of awareness and understanding of specific groups when there is a lack of appropriately trained personnel.

DEGREE PROGRAMS AND CURRICULA

Courses in some aspects of integrated coastal zone management are being offered by tertiary institutions of the region and are in various stages of development. Due to its multidisciplinary nature, many of these courses remain within their respective faculties and retain a discipline bias. Other constraints include the absence of curriculum guidelines and the limited number of instructional materials and educators trained in coastal zone management.

A structured degree course in coastal zone management requires input from many disciplines and an inevitable adjustment of administrative and operational procedures within institutions. Such a change should be worth the effort for one or two universities to meet and to serve the needs of the region.

Participants at a regional workshop that assessed coastal area management education in the ASEAN region agreed that trained manpower in ICM is not adequately provided by the region's educational institutions (Chua, 1991). While both formal and nonformal education in coastal area management were considered important, the workshop restricted discussion to formal education in which a master's program in ICM

management was considered necessary for coastal area planners and managers. A proposed one-year master's curriculum focused on issues of regional relevance and covered basic principles of tropical ICM, with emphasis on regional and developing country examples. In this way, educational institutions can adopt the curriculum on a national or regional basis.

Throughout Southeast Asia, only the Prince of Songkla University (Thailand) established a two-year master's and a one-year diploma program in Coastal Resources Management established in 1991 (Boromthanarat, 1991). Implemented through its Coastal Resources Institute (CORIN), the curricula outlined a multidisciplinary approach. Zulfigar (1993) indicated that two Malaysian universities, the Agricultural University (UPM) and the Malaysian Science University (USM) expected to offer master's degree programs in coastal zone management beginning in 1994. The proposed duration of these programs is 18 to 24 months. While the curriculum developed by UPM takes a multidisciplinary and generalized approach, the one developed by USM provides the opportunity to specialize in either pollution studies, coastal ecology, or aquaculture. These topics were selected based on the country's needs. The National University of Singapore has recently established an interdisciplinary consultative group on environmental issues and technology, thus paving the way for it to consider multidisciplinary degree programs such as ICM.

In all types of training, the approach is to provide trainees with interdisciplinary skills so they can identify and implement appropriate solutions to coastal zone management problems and adopt preventive and mitigating strategies, rather than training them in multidisciplinary or single-discipline programs. Hay (1993) advocates the maturation of training programs focusing on solution-oriented approaches, rather than sectoral problem identification and quantification and development of generalized approaches.

NETTLAP

The Network for Environmental Training at Tertiary Level in Asia-Pacific (NETTLAP) is a UNEP initiative designed to enhance the capacity of tertiary institutions in the Asia-Pacific region to help meet the education and training demands associated with efforts to achieve sustainable development in the region. The ultimate aim of the program is to strengthen environmental expertise at both the technical and the managerial levels in the region. This is to be achieved by increasing the environmental expertise of tertiary-level educators and, through them, graduates of tertiary institutions, decision makers, and policy formulators in both government and private sector.

The Network is comprised of key tertiary-level environmental institutions and educators throughout the

Asia-Pacific. It will develop and apply innovative methods in environmental training, identify needs, and share knowledge through ongoing interaction among network partners; prepare and disseminate instructional materials, curricula guidelines, and training and educational systems; and convene technical training seminars and workshops. The project is implemented by UNEP/ROAP, in collaboration with UNEP's Environmental Education and Training Unit (EETU). It was initiated in January 1993 as the second phase of an earlier activity arising from the recommendations of the Regional Meeting of Experts to Develop a Programme of Action for Environmental Education and Training in Asia and the Pacific (Bangkok, November, 1985).

Within the project's framework, three thematic networks have been established, each with a different coordinator and supported by two additional network nodes. These thematic networks are Coastal Zone Management, Environmental Economics, and Toxic Chemicals and Hazardous Wastes. Coordination of project activities is through national focal points identified by participating countries and through specialist focal points, one for each Network theme.

It is envisaged that many of the identified constraints to ICM training can be addressed through the Coastal Zone Management Thematic Network of NETTLAP. The identification of appropriate training materials which have been developed within the region and their wide dissemination would be one logical solution to assist coastal zone management educators establish effective and much-needed training programs. Such programs would significantly contribute towards producing sufficient numbers of trained personnel equipped to handle coastal zone management problems.

The project now has an established network of tertiary level educators in coastal zone management, allowing members to communicate and exchange information on materials and curricula which have been developed and used successfully.

Through the Coordinating Body on the Seas of East Asia (COBSEA), an intergovernmental organization that advises UNEP on the East Asian Seas Action Plan, two projects have been implemented to produce training materials. Materials have been recently developed for the management staff of marine protected areas (Kenchington & Ch'ng, 1994), while those for ICZM are being finalized for publication in late 1995.

REFERENCES

- Boromthanasarat, S. (1991). The establishment of a Master of Science degree and a diploma course in coastal resources management: Prince of Songkla University, Thailand. In T.E. Chua (ed.) *Coastal area management education in the ASEAN region*. Manila, Philippines: International Center for Living Aquatic Resources Management.
- Chou, L.M. (1994a). Marine environmental issues of Southeast Asia: state and development. *Hydrobiologia*, 285, 139-150.
- Chou, L.M. (1994. November-December)b. *The role of tertiary institutions in integrated coastal zone management training*. Paper presented at the UNEP/NETTLAP Training and Resources Development Workshop in Coastal Zone Management, Kandy, Sri Lanka.
- Chua, T.E. (Ed.) (1991). *Coastal area management education in the ASEAN region*. Manila, Philippines. International Center for Living Aquatic Resources Management.
- Chua, T.E. & Garces, L.R. (1994). Marine living resources management in the ASEAN region: lessons learned and the integrated management approach. *Hydrobiologia*, 285, 257-270.
- Crawford, B.R. & West, N. (1993, July). *Professional training for international coastal resource managers*. Paper presented at the 8th Symposium on Coastal and Ocean Management, New Orleans, LA.
- Crawford, B.R., Cobb, J.S. & Friedman, A. (1993). Building capacity for integrated coastal management in developing countries. *Ocean and Coastal Management*, 21, 311-337.
- Dalusung, M.L. 1992. Post-training survey report of the ASEAN/US coastal resource management project. *Tropical Coastal Area Management*. 6(3), 34-36.
- Economic and Social Commission for Asia and the Pacific (ESCAP). (1992). State of the environment in Asia and the Pacific 1990. ST/ESCAP/917.
- Hay, J.E. (1993). Retrospective, contemporary and prospective views on training programmes for integrated coastal zone management: a comparative analysis. In J.E. Hay and L.M. Chou (Eds.) *Contributions to training in coastal zone management in the Asia-Pacific region and report of the first NETTLAP Resources Development Workshop for Education and Training at Tertiary Level in Coastal Zone Management*. Bangkok: Network for Environmental Training at Tertiary Level in Asia and Pacific.
- Hay, J.E. & Chou, L.M. (Eds.) (1993). *Contributions to training in coastal zone management in the Asia-Pacific region and report of the first NETTLAP Resources Development Workshop for Education and Training at Tertiary Level in Coastal Zone Management*. Bangkok:

- Network for Environmental Training at Tertiary Level in Asia and Pacific.
- Hay, J.E. & Pradhan, M. (Eds.) (1993). Environmental training at tertiary level in the Asia-Pacific region. In J.E. Hay and L.M. Chou (Eds.) *Contributions to training in coastal zone management in the Asia-Pacific region and report of the first NETTLAP Resources Development Workshop for Education and Training at Tertiary Level in Coastal Zone Management*. Bangkok: Network for Environmental Training at Tertiary Level in Asia and Pacific.
- Hay, J.E., Chou, L.M., Sharp, B. & Thom, N.G. (1994). Environmental and related issues in the Asia-Pacific region: implications for tertiary-level environmental training. In J.E. Hay and L.M. Chou (Eds.) *Contributions to training in coastal zone management in the Asia-Pacific region and report of the first NETTLAP Resources Development Workshop for Education and Training at Tertiary Level in Coastal Zone Management*. Bangkok: Network for Environmental Training at Tertiary Level in Asia and Pacific.
- Kenchington, R. (1993). Coastal zone management training programmes for educators, managers and the public. In J.E. Hay and L.M. Chou (Eds.) *Contributions to training in coastal zone management in the Asia-Pacific region and report of the first NETTLAP Resources Development Workshop for Education and Training at Tertiary Level in Coastal Zone Management*. Bangkok: Network for Environmental Training at Tertiary Level in Asia and Pacific.
- Kenchington, R. & Ch'ng, K.L. (Eds.). (1994). Staff training materials for the management of marine protected areas. RCU/EAS Technical Reports Series No. 4. Bangkok: UNEP.
- McManus, L.T. (1993). Training needs in and teaching curricula for coastal zone management in the Asia-Pacific. In J.E. Hay and L.M. Chou (Eds.) *Contributions to training in coastal zone management in the Asia-Pacific region and report of the first NETTLAP Resources Development Workshop for Education and Training at Tertiary Level in Coastal Zone Management*, (pp. 15-24). Bangkok: Network for Environmental Training at Tertiary Level in Asia and Pacific.
- Scura, L.F., Chua, T.E., Pido, M.D. & Paw, J.N. (1992). Lessons for integrated coastal zone management: the ASEAN experience. In T.E. Chua and L.F. Scura (Eds.) *Integrative framework and methods for coastal area management* (pp. 1-70). Manila, Philippines: International Center for Living Aquatic Resources Management.
- Zulfigar Y. (1993). Coastal zone management training in Malaysia. In J.E. Hay and L.M. Chou (Eds.) *Contributions to training in coastal zone management in the Asia-Pacific region and report of the first NETTLAP Resources Development Workshop for Education and Training at Tertiary Level in Coastal Zone Management* (pp. 143-148). Bangkok: Network for Environmental Training at Tertiary Level in Asia and Pacific.

TRAINING FOR INTEGRATED COASTAL MANAGEMENT: A REVIEW OF TRENDS, ISSUES, AND APPROACHES FOR THE 21ST CENTURY

Brian Crawford

Coastal Resources Center
The University of Rhode Island
Narragansett, RI, U.S.A.

ABSTRACT

In the wake of the Earth Summit, there has been an explosion of international integrated coastal management (ICM) initiatives along with a commensurate increase in international training courses and networks. Unlike many developed countries, degree programs in ICM do not yet exist in developing countries. However, many are expected to be established in the near future. Until significant numbers of degree programs are established in developing countries, the demand for short-term training in ICM will remain high. Efforts now emphasize group-based intensive training courses in planning and management for government administrators. Rapid expansion of training initiatives is hampered by the small number of experienced practitioner-trainers and the lack of packaged ICM materials. In the absence of an accepted paradigm for ICM and an associated set of tools, training curriculum and trainers must be able to adapt to a changing context. New information and telecommunication technology for global distance learning programs in ICM could expand the base of practitioners. The case study approach for teaching ICM needs to be used more extensively and training activities should be more closely linked to ongoing ICM field initiatives and programs.

BACKGROUND

The United Nations Conference on Environment and Development outlined an ambitious agenda for integrated management and sustainable development of coastal and marine areas. Agenda 21, Chapter 17 calls for coastal nations to provide human resource development and training (17.6(k)). In addition, capacity building and human resource development are considered the major means of implementation:

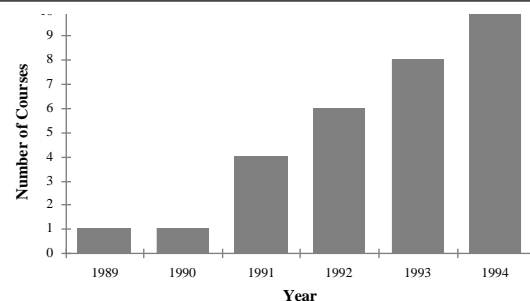
"17.15 Coastal States should promote and facilitate the organization of education and training in integrated coastal and marine management and sustainable development..."

"17.16 ...capacity building should be included in bilateral and multilateral development cooperation. Coastal States may consider, inter alia (f) Promoting and facilitating human resource development and education ..."
(UNCED, 1992)

In the wake of the Earth Summit (UNCED II), there has been increasing interest among coastal states con-

cerning integrated coastal management (ICM) as well as increasing donor interest. This has been demonstrated by an increase in donor projects and national programs in ICM. Commensurate with this increase in programs, the number of regional and international training programs is also increasing (see Fig. 1). In

Figure 1. International Coastal Management Training Courses



Source: Crawford, et. al., 1994

response to Agenda 21, the UN has also initiated several training networks (NETTLAP, TRAIN-SEACOAST) to develop and share training materials and build ICM training and educational capacity.

UNITED STATES EXPERIENCE

Two decades ago in the United States, a similar explosion of coastal management initiatives was spawned when the Federal Coastal Zone Management Program was established. This program facilitated the proliferation of local, state coastal zone management (CZM) programs. During this same period, the Law of the Sea was being negotiated and other important U.S. environmental legislation was passed, such as the Clean Air Act and the Clean Water Act. This generated a need for trained manpower, people with the knowledge and skills to plan, manage, and administer these programs. U.S. universities established degree programs and specializations in marine affairs and coastal zone management as a way to provide this manpower. There was very little coastal management experience to draw on when designing these academic programs two decades

ago. Furthermore, there was no tradition in government to train existing manpower through short-term intensive courses as there is now in the international development community.

Initially, professionals from traditional academic disciplines, such as law, oceanography, and planning, were called on to fill coastal management positions. Together, with a group of academics also from traditional backgrounds who were building multidisciplinary degree programs, they pioneered the coastal management profession. Changes in university programs in the 1980s included development of coastal zone management specializations within many marine affairs programs. This emphasis increased student interest in the field. In addition, centers and institutes were created to provide specialized services to government and the general public through outreach programs in education, applied research, and technical assistance. Degree programs other than marine affairs, such as oceanography and environmental sciences, started developing CZM degree specializations as well.

TABLE 1: UNIVERSITY DEGREE PROGRAMS OFFERING A SPECIALIZATION IN COASTAL MANAGEMENT

University	Country	Degree(s)
Bournemouth Polytechnic	UK	M.Sc. (Coastal Zone Management)
Dalhousie University	Canada	Master's of Environmental Science Master's of Marine Management
Duke University	USA	Master's of Environmental Management (with a specialization in coastal environmental management)
Florida Institute of Technology	USA	M.S. (Oceanography, a coastal zone management option)
Middle East Technical University	Turkey	M.S. (Coastal Zone Management) (proposed 1994-5)
Nova University	USA	M.S. (Ocean Science with a specialty in coastal zone management)
Oregon State University	USA	M.S. (Marine Resource Management with a specialization in ocean and coastal resources management)
Prince of Songkla University	Thailand	M.S. (Coastal Zone Management)
Universidad Autonoma de Baja California	Mexico	Post-Bachelor's Certificate (Marine Resource Management) M.S. (Coastal Zone Management) (proposed 1995)
University of Delaware	USA	Ph.D. in Marine (Policy) Studies, Master's in Marine Policy (M.M.P.)
University of Malta	Malta	M.A. Coastal and Ocean Management (proposed)
University of Massachusetts	USA	Ph.D., M.S. (Environmental Science)
University of Newcastle Upon Tyne	UK	M.Sc. (Tropical Coastal Management)
University of North Carolina	USA	Master's of Regional Planning
Universiti Pertanian	Malaysia	M.Sc. Coastal Zone Management (proposed 1995)
University of Rhode Island	USA	B.A., M.M.A, M.A.M.A (Marine Affairs)
Universiti Sains	Malaysia	M.Sc. Coastal Zone Management (proposed 1995)
University of Technology, Sydney	Australia	Master's in Applied Science (Coastal Resources Management)
University of West Florida	USA	M.P.A (Political Science), M.S. (Biology)

Source: Adapted and updated from Crawford, et. al., 1993

CURRENT TRENDS WORLDWIDE

Coastal management degree programs are beginning to become established in Canada, the United Kingdom, and Australia. Many of these degree programs have a large percentage of international students, as similar programs do not yet exist outside of a few developed countries. The same growth of degree programs seen in developed countries is starting to occur in the rest of the world, where a handful of ICM degree programs have been proposed (see Table 1). However, the context in which this is occurring is somewhat different.

- There is a small but growing body of developing country experience where socioeconomic, political, institutional, demographic, technical, and human resource contexts are often quite different from developed countries.
- The U.S. has two decades of experience that other nations can draw from—the environmental issues are similar although the institutional context is different. Ironically, the U.S. is moving toward a

paradigm similar to developing countries with limited government finances, less of a regulatory command and control approach, and a sustainable development philosophy.

- In developing countries, donors and national governments are willing to invest in intensive training of working professionals as a short-term answer to meeting manpower needs.
- Many universities in developing countries, like their governments, do not have the same level of financing and technical expertise as does the United States. Universities in the United States are facing financial hardships, downsizing, and rethinking ICM educational programs.

The explosion of ICM programs in developing countries, accelerated by Agenda 21, has created an immediate demand for ICM professionals. In the short term, this demand is being met with increased training programs targeted at regional and international audiences

TABLE 2: PROFESSIONAL TRAINING PROGRAMS IN COASTAL MANAGEMENT FOR INTERNATIONAL PARTICIPANTS.

Title	Organization	Date/Duration	Training Site(s)
Coastal Resource Management Planning	SPREP/ESCAP	2 weeks (1987, 88)	South Pacific
International Seminar on Coastal Parks and Protected Areas	University of Miami, National Parks Service	3-4 weeks (1989, 91)	Florida, USA & Costa Rica
Summer Institute in Coastal Management	University of Rhode Island, USAID	4 weeks (1991, 92, 94)	Rhode Island, USA
Seminar on Coastal Zone Management	International Institute for Infrastructural, Hydraulic and Environmental Engineering	4 weeks (1991, 92, 93, 94)	Delft, The Netherlands
Systems of Environmental Management of Enclosed Coastal Sea	Kyoto University Hyogo Prefecture, JICA	10 weeks (1991, 92, 93, 94)	Japan
Coastal Zone Environmental Planning	Asian Institute of Technology	13 weeks (1991,92)	Bangkok, Thailand
Special Area Management for Coastal Environments	University of Rhode Island, USAID, and Cooperating Regional Universities	2 weeks (1992-PSU, Thailand) (1993-94-ESPOL, Ecuador) (1993-Silliman Univ., Phil.)	Thailand Ecuador Philippines
Ecology and Management of Tropical Estuaries	Universidad Autonoma de Campeche, Mexico	4 weeks (1992, 93, 94)	Mexico
International Course on Coastal Zone Management	UNIDO-ICS, University of Padova	2 weeks (1992)	Italy
Coastal Zone Management as a Sustainable Program	International Ocean Institute, UNDP	10 weeks (1993)	India
Integrated Coastal Resources Management Planning	Prince of Songkla University	3 weeks (1993, 94)	Hatyai, Thailand
Coastal Zone Management with a Focus on Small Islands	International Ocean Institute, UNDP	8 weeks (1994)	Malta
Coastal Environmental Management	Macquarie Univ.	7 weeks (1994)	Australia
MEDCOAST Institute	MEDCOAST Initiative Middle East Tech. Univ.	4 weeks (1994)	Turkey

(Crawford, et. al. 1993; Dalusung, 1991) as well as UN organizations (UNDP/DGIP-DOALOS, 1994; Hay & Chou, 1993; SPREP, 1987, 1988).

(see Table 2). In addition, ICM training is also exploding at the local and national level in countries, such as the Philippines, Ecuador, and Sri Lanka, where significant ICM programs have been established. It can be argued that the explosion of training initiatives directed at developing countries is partially the result of local universities not providing graduates with the appropriate knowledge and skills required to fill new positions as integrated coastal planners and managers. In all fairness, university degree programs cannot be established overnight. This underscores the need to increase the capacity of a university, including faculty development, to create ICM educational programs in developing countries for the long term. Until such programs are established, demand for skilled ICM practitioners in developing countries will continue to be met through short-term training programs, on-the-job training, and by university graduates from developed countries.

Trends suggest that there will be a continued need for a large number of ICM training initiatives over the next five to ten years. In addition, the number of local and national training initiatives will undoubtedly continue to grow. Mid-career training of ICM professionals will also be required since ICM is a new and emerging field and the paradigm, methods, and techniques are still developing and changing. Updating practitioners will also be necessary as a larger body of experience is assembled and technological advancements are made. Given this projected growth and the trends in ICM training and educational programs, a number of issues need to be considered including:

- Training of trainers and faculty development
- Materials development to support training and educational programs
- Implications of a changing and evolving ICM paradigm and associated set of tools
- Linkages between training programs and emerging educational degree programs
- The role of evolving communication and computer-based learning technology
- Coordination among current training and educational providers to maximize financial investments in ICM training

TRAINING APPROACHES

A review and comparison of current approaches to ICM training can help provide insights into the future directions needed as the profession grows and looks towards the 21st century. Special attention is given in this section to the Coastal Resources Center's training approach. There is a growing body of literature documenting ICM training experience. This includes major initiatives by USAID.

The majority of training initiatives at the regional and international level involve intensive short-term training courses from one to several weeks. Typically, these courses are conducted in conjunction with a university, utilizing their facilities as well as drawing heavily on their technical expertise as course faculty for more technically oriented courses. Participants have been scientists and specialists. More typically, however, courses focus on the needs of decision makers and government managers. To a lesser extent, participants from NGOs and the private sector have been represented. However, in many national and local training initiatives that are part of larger ICM programs, user groups and NGOs are better represented. Content varies from environmental impact assessment, marine protected area management, coral reef monitoring and assessment, to coastal management and planning. Courses tend to have either a technical and scientific orientation, or a planning and management orientation.

Two major USAID coastal management programs, which have incorporated several field sites, have used a large variety of training approaches including degree training, on-the-job training, workshops, conferences, as well as short-term intensive training courses. Short-term group-based training courses seem to be the most frequent mode of training for local field ICM programs.

It is difficult to compare training methodologies used in regional and international courses because they are not mentioned much in the available literature. Many courses seem to take a typical academic approach with lectures, reading assignments and field trips, as well as the use of a large number of faculty from various disciplines to deliver the pieces of an interdisciplinary curriculum.

Many individuals involved with the URI-USAID/Coastal Resource Management Program (CRMP) field programs are also involved in the Coastal Resources Center (CRC) international courses, and individuals who were involved with the USAID-Association of Southeast Asian Nations (ASEAN) /CRMP are active in the Network for Environmental Training at Tertiary Level in Asia Pacific (NETTLAP). This suggests that professionals with experience in ICM planning and management are the most appropriate trainers and educators. Technical expertise, however, does not mean individuals necessarily have strong capabilities to teach. The Coastal Resources Center (CRC) has created workshops to develop professionals with ICM technical and field expertise. The workshops provide them with an additional set of skills in training methods, course and curriculum development, and facilitation techniques. We refer to such individuals as practitioner-trainers. These individuals, or practitioner-trainers, are then used as core trainers in regional and international training courses. CRC has also borrowed from training

approaches used in other fields such as public health and business management. These approaches involve building the analytic and problem-solving ability of participants by examining case studies of actual ICM programs, issues, and situations, in a participatory and experiential manner. This approach is also being used in the field of sustainable agriculture. Stanford (1994) makes a distinction between "decision cases", involving issues and resolutions, as opposed to descriptive or documentary cases. CRC courses concentrate on the former approach.

At the project level, training approaches need greater attention. In new field initiatives in East Africa, CRC is linking training workshops closely to field work as a way to deliver technical assistance. The goal is to design sessions based on tasks that are required to be carried out by interagency project teams. What is learned from these training sessions is then immediately applied to on-going work. The fisheries sector project in the Philippines uses a similar approach in developing bay management plans (White and Lopez, 1991). CRC is also developing a new international course with this approach in mind. This collaborative effort among CRC, USAID, and the U.S. Environmental Protection Agency examines U.S. experience in bay and estuarine management as it applies to similar international management initiatives. By extracting lessons from U.S. experience through case studies, participants from a selected group of similar programs may apply and adapt these principles directly to their own situations. As currently designed, participants will constantly review their own program situations throughout the course, contrasting them to U.S. case experiences.

ISSUES FOR ICM TRAINING

There are not many experienced practitioners, and their services in management programs are in high demand. Therefore, the need for ICM training courses and trainers is high. Hence, the extent to which this small group of experienced practitioners can be drawn on as trainers and educators is limited, making it difficult to conduct enough training programs to fill the demand. Regional and international training programs are taught in small group settings. This approach slows the rate at which new ICM practitioners can be developed as only a limited number of spaces are available in these courses. The costs, including travel, lodging, and instructional fees are relatively high. Building up a worldwide guild of ICM practitioners is further complicated by the fact that ICM is a new and emerging field without a generally accepted paradigm or an associated set of tools and methods. Experts cannot even agree on what to call the field—integrated coastal management, coastal ecosystem management, coastal area management, or coastal zone management—let alone what should be taught. As the ICM paradigm changes and

evolves, the content and curricula of ICM courses must keep pace. This requires that trainers and faculty keep up with developments in the field. In addition, there is the question about the heterogeneity for ICM from place to place within a nation as well as among nations and regions of the world. The U.S. experience illustrates this. While each state follows established federal guidelines, they have developed a specific approach and plan, different due to varying resources and environmental issues, institutional structures, politics, culture, and economies. How much of ICM is directly transferable? How much must be adapted and crafted to a place, and how can people be taught to do it?

There are several strategies for dealing with these problems. The CRC approach of developing trainer-practitioners provides flexibility in adapting training designs to the needs of the participants and to local situations in varying localities. This strategy accommodates rapid curriculum changes as the state of ICM advances. This trainer-dependent approach, however, requires highly experienced ICM practitioners with skills in training, a combination that is in short supply. Another interesting approach being taken by TRAIN-SEA-COAST emphasizes developing validated, packaged, training modules that can be shared with other training professionals within the global network. This strategy disseminates information and materials rapidly. However, it raises questions as to whether the user is qualified to teach the subject. Materials may have to undergo significant revisions to be relevant for a local context. Rapid advances in the field require that materials be updated continually. It is clear that neither of these approaches is ideal. A diversified, multifaceted approach may be best.

The University of the South Pacific has used distance learning to reach out to isolated and widely separated communities throughout the South Pacific in a variety of subjects. Many universities in the U.S. are combining the traditional distance learning approach of correspondence courses with new information and telecommunication technologies, making programs interactive and so that they coincide with "real time." For instance, National Technical University delivers advanced educational programs to engineers, scientists, and managers at their work place so that they can earn a master's of science degree. Forty-five participating universities teach courses which are broadcast via satellite to more than 300 sites around the nation. The JASON Project, the brainchild of Dr. Robert Ballard, uses real-time interactive satellite communication to broadcast—all over the world—explorations of science, technology, and the environment. These transmissions are broadcast to school children in several nations. ICM training at the international, regional, and national levels has not attempted to utilize this approach on a wide-scale basis.

LOOKING TOWARD THE 21ST CENTURY

The future means change—changes in the condition of our coastal resources and environments, changes in population, changes in technology, changes in our societies and way of life, and changes in the ICM paradigm. An ICM education and training strategy must incorporate change as a part of the operating environment. We must continually examine where we are and where we are going, both from the standpoint of ICM as a profession, as well as how it is taught and learned. Technological advances will continue to offer new and innovative means to link practitioners and academics closer together and in more cost-effective ways. Already the Internet, World Wide Web and MBONE provide real-time communication at a very low cost. The technology for interactive telecommunications, allowing visual and audio links through personal computers, is available and inexpensive. By the end of the decade, new low-orbit satellite networks will allow the use of portable (the size of a briefcase) up-link and down-link equipment, available at the same cost as a personal computer, to be used from virtually any location on the planet. These new technologies offer the opportunity to increase information exchange, discussions, and debates cheaper and faster than ever through person-to-person contacts at training courses, conferences, and technical assistance missions delivered through the century-old technology of the airplane. This is not the death knell for traditional forms of teaching. It does, however, create cost-effective ways to facilitate learning with a larger group of professionals.

The ICM community can establish a “virtual university” where courses are taught by specialists in several different nations at several different universities, and students can log-on from any nation. Academic credits can be offered by several universities, and, eventually, students can be awarded a degree in coastal management from one of the participating member universities.

One of the most effective ways to learn is through experience. Virtual reality or cyberspace is no substitute for real lessons honed from on-the-ground field experience. On-the-job training and internships between more mature and younger programs is an underutilized approach and needs to be revisited. As the number of programs expand, the capability of managing increasing numbers of internships and exchanges will also expand. Training and education must result in real changes within individuals on-site, the organizations for whom they work, and in the quality of life of people in coastal regions. This is the ultimate goal of all ICM training efforts. Since the human race continues to make the same mistakes over and over again, experience alone is no indicator that learning has actually taken place. Educators must work closely with practitioners to facilitate learning from their experience,

help others learn how to learn, and pursue the means by which we draw lessons from the growing body of worldwide ICM experience.

While there has been a proliferation of ICM training at the regional and international level, more activities should be moved down to the local and national level. Peter Block, a leading management guru suggests that training must focus on the group or the team of individuals who are closest to the work. The more training is linked to work on-site, the closer we get to real problems, and the easier direct applications of learning will be. Ultimately, this will also make training more cost effective and will relate it more directly to improving coastal conditions.

Training budgets are usually a small portion of institutional budgets. Because administrators are often interested only in whether training has been conducted, any elaborate evaluation or follow-up are typically considered luxuries that a program cannot afford. However, evaluation and follow-up are essential to demonstrate that investments in training are having an impact. Much more attention needs to be given to evaluation of training, particularly as ICM training activities increase.

At the very minimum, ICM practitioners must be agile problem solvers who can work in a variety of situations. They must be the equivalent of the MBA in the business world, or the doctor or nurse in a hospital. In these professions, the case study method of teaching has proven highly effective. A similar approach needs to be adopted more widely within the ICM training and academic community.

Courses emphasize technical tools and planning approaches. Over time, more emphasis needs to be placed on a diversified content including management, administration, and evaluation. In addition, more courses will be needed that concentrate on specific ICM issues. The need to expand more specialized training in areas such as economic valuation and analysis can also be expected. As courses become more specialized, the clients of such programs will also become more diverse and specialized. The private sector has not been involved much in ICM training initiatives, and closer examination of their contributions and needs is merited.

Lastly, a major challenge will be to deal with the diverse view that constitutes the ICM paradigm. Eventually, we will need to move from discussions of philosophical approaches of sustainable development, public participation, and technocratic approaches, to the nuts and bolts of how to make such concepts work. In the meantime, we need to learn how to deal with diverse viewpoints and understand that this is a moving target. For new practitioners, this may be a confounding hindrance in trying to discover which approaches are best to adopt for their own situation. On the other hand, diverse approaches from which to choose may

**TABLE 3: A FRAMEWORK FOR ASSESSING UNIVERSITY CAPACITY
IN INTEGRATED COASTAL MANAGEMENT**

Area/Indicator	Level of Capacity		
	High	Moderate	Low
Faculty			
Educational level of faculty in CRM related programs	PhD's (> 75%)	PhD's (<75% >25%)	PhD's (< 25%)
Faculty & Depts. in multiple ICM disciplines (natural, social and applied sciences)	three discipline groups	two discipline groups	one discipline group
Educational Programs			
Level of degree programs offered in ICM related programs	Doctorates	Masters	Bachelors
ICM related disciplines taught:			
Natural science (marine science, oceanography)	All three theme areas (natural, social, applied)	Two theme areas (natural, social, applied)	One or less theme area (natural, social, applied)
Applied science (resource economics, public administration, coastal engineering, fisheries)			
Social science (community development, social work, anthropology)			
ICM degree or ICM specialization within a degree offered	Degree or degree specialization	At least one ICM course taught	No degree or courses offered
Service			
ICM related public education & outreach programs	Service provided in all three areas (TA, pub. ed., training)	1-2 service areas provided (TA, pub. ed., training)	No service provided in theme areas
training of local government and user groups			
technical assistance for local & national govt.			
Policy and ICM Relevant Research			
Natural science research	Research in all 3 theme areas and interdisciplinary studies	Research in 2-3 theme areas or interdisciplinary studies	Research in one or less theme areas
Social science research			
Applied science research			
Interdisciplinary and/or interdepartmental studies			
Multidisciplinary "Centers"			
ICM related unit in the university that integrates education, service and research in ICM	Unit integrates 2 or more mission areas	Unit has mission in only one theme area	No unit
University Infrastructure			
Research and extension support infrastructure	strong	moderate	poor
Financial Considerations			
University financing	University & government financing for ICM increasing	University & government financing for ICM stable or only one increasing	University and/or government financing for ICM declining
National government financing			
Exogenous Factors			
National program, plan or project	National ICM programs established with or without sub-national plans	Sub-National ICM programs, established but no national programs	No ICM programs, plans or projects
Sub-national plans or projects			

be desirable. The need for ongoing dialogues and debate involving academics and practitioners is clearly needed. Many ICM conferences are no more than a reportage on projects and programs, with little effort at synthesis or debate about the paradigm. Future workshops on this topic are needed.

Universities have been the traditional base for the majority of ICM training as part of their public service role. Part of the university's traditional mission is to contribute research and provide a focal point for paradigm discussions. Universities, therefore, are situated to bring about shifts in paradigm thinking and to quickly develop new tools via on-going training of practitioners. For universities to be capable of ICM training, they must be involved in ICM from the many facets of the university mission, including public service, research, and education. Table 3 provides a framework for assessing university ICM capacity. Strengthening universities in ICM, therefore, strengthens capability for short-term ICM training and can also achieve sustainable long-term ICM educational capacity. Advancement of ICM education and training requires increasing dialogues and partnerships among universities, government, NGOs, and the private sector. Enhanced communication and exchanges among educators is also needed.

REFERENCES

- Crawford, B.C., Santos, J.L. and DeMoranville, M. (1994). University Partnerships: An Approach to Collaborative International Training. In P.G. Wells and P.J. Ricketts. (Eds.). *Coastal Zone Canada '94, Cooperation in the Coastal Zone*, Vol. 2 pp. 745-756. Dartmouth, N.S.: Coastal Zone Canada Association.
- Crawford, B., Cobb, J.S. and Friedman, A. (1993). Building Capacity for Integrated Coastal Management in Developing Countries. *Ocean and Coastal Management*, 21, 311-337.
- Dalusung, M.D., (1991). Post-training survey report of the ASEAN/US Coastal Resources Management Project. In *Tropical Coastal Area Management*, 14 (3) 34 - 37.
- Hay, J.E. & Chou, L.M. (1993). *Contributions to training in coastal zone management in the Asia-Pacific region and report of the first NETTLAP Resources Development Workshop for Education and Training at Tertiary Level in Coastal Zone Management*. Bangkok: Network for Environmental Training at Tertiary Level in the Asia and Pacific.
- Report on the SPREP/ESCAP coastal resources management planning training programme 1987*. Noumea, New Caledonia: South Pacific Commission.
- Report on the SPREP/ESCAP training course in coastal resources management planning, Port Vila, Vanuatu*, 8-19 February 1988. Noumea, New Caledonia: South Pacific Commission.

- Stanford, M.J., Crookston, R.K. , Davis, D.W. , & Simmons, S.R. (1994). *Decision cases for Agriculture*. St. Paul: University of Minnesota, Department of Agronomy.
- UNCED. (1992). Chapter 17: Protection of the oceans, all kinds of seas, including enclosed and semi-enclosed seas, and coastal areas and the protection, rational use and development of their living resources. In *Agenda 21: programme of action for sustainable development; Rio Declaration on Environment and Development*. New York, NY: United Nations Dept. of Public Information.
- UNDP/DPIG-DOALOS. (1994). Action Plan for Human Resources Development and Capacity Building for the Planning and Management of Coastal and Marine Areas, 1993-1997. United Nations Development Programme, Division for Global and Interregional Programs, and, Division of Ocean Affairs and the Law of the Sea, Office of Legal Affairs. 58p.
- White, A. & Lopez, N. (1991). Coastal resources management planning and implementation for the Fishery Sector Program of the Philippines. In O.T. Magoon, H. Converse, V. Tippie, L.T. Tobin & D. Clark. (Eds.) *Coastal zone '91* (pp. 762-775). New York: American Society of Civil Engineers.

CAPACITY BUILDING AT A GRADUATE LEVEL EDUCATIONAL PROGRAM IN COASTAL ZONE MANAGEMENT: A CASE STUDY OF THE AUTONOMOUS UNIVERSITY OF BAJA CALIFORNIA, ENSENADA CAMPUS, MÉXICO

José Luis Fermán-Almada

Lorenzo Gómez-Morin Fuentes

Ileana Espejel Carbajal

David W. Fischer

Universidad Autonoma de Baja California

Ensenada, Baja California, Mexico

ABSTRACT

This paper examines the experience of the Universidad Autonoma de Baja California in developing educational programs in coastal management. Several degree and non-degree programs are offered through the Marine Sciences School which includes a certificate program at the post-bachelor's level in Marine Resources Management, a master's program in coastal oceanography with a specialization in coastal zone management, and a master's program through the school of sciences in management of arid ecosystems with a specialization in coastal zone management. A master's program in Coastal Zone Management has been proposed that would be administered through an Integrated Coastal Resources Management Center. This program would closely integrate theory, practice, and analysis as the core areas of a balanced curriculum and would link research and service activities of the Center's faculty. Curriculum offerings and faculty backgrounds for the various coastal management-related programs at the university are summarized.

INTRODUCTION

México has a coastline of 11,600km with 12,500km² of coastal lagoons which, when stretched to encompass the 200-mile Exclusive Economic Zone, gives it a coastal zone of approximately 2,900 million km². México also enjoys an enormous set of benefits intrinsic to using this coastal zone for tourism, fishing, trade and industry, petroleum, agriculture, and urbanization (Toledo, 1990). México also has a growing number of higher educational institutions oriented to the coastal zone, particularly oceanographic institutes. Since 1960, three oceanographic institutions have been established, each with a traditional ocean science research and educational program.

At the same time, México is plagued by problems that constrain the efficient use of its coastal zone. Such problems are not necessarily unique to México, but they are generally classified as substantive problems and decision-process problems. Substantive problems

include air and water pollution, conflicts between competing uses, population pressures, habitat degradation and destruction, reduced coastal access, and distortion of local coastal economies. Decision process problems include lack of planning and coordination, lack of local participation, overcentralized decision making, lack of scientific studies, lack of funding, and lack of consideration of the coastal zone as an entity. Each of these general categories can be countered through improved coastal zone legislation and funding implemented by professionals educated in coastal zone management.

Higher education in coastal zone management throughout the world is a recent phenomenon. It was not until the early 1970s that coastal studies and marine affairs programs began to emerge in the United States, and even there, few strong programs specifically oriented to the coastal zone have been strengthened and survived. Today only seven higher education pro-

grams in coastal studies have been identified in the U.S. (West, 1986), while others have disappeared by being forced to exist on external funding or have succumbed to academic "turf wars" (Fischer, 1983).

Coastal zone scholars in the United States credit the passage of the National Coastal Zone Management Act of 1972 and the subsequent demand for specially educated coastal professionals by federal and state governments for the success of the remaining higher education programs in coastal studies. One element that is key to the continued success of the remaining programs is the growing demand for professionally educated coastal zone managers worldwide. Indeed, to date only one university offers a master's degree specifically in coastal zone management geared to mature students from less developed nations (West, 1987).

COASTAL ZONE MANAGEMENT EDUCATION IN MEXICO

The graduate programs in coastal management in México have been developed since 1980 by different universities:

1. Instituto Tecnológico de Estudios Superiores de Monterrey Campus Guaymas, Sonora (High Education Institute of Monterrey in Guaymas, Sonora)

This institute offers a master's program in Natural Resources Management, Ecology and Conservation.

2. Universidad Autónoma de Campeche (Autonomous University of Campeche)

This university began a program called Ecology, Fisheries and Oceanography of the Gulf of México (EPOMEX). This program offer different courses in coastal management such as Economic of Tropical Coastal Ecosystems.

3. Centro de Investigaciones de Quintana Roo, CIQRO. (Research Center of Quintana Roo)

This research center offers a program called Integrated Coastal Zone Management and involves the development of different research topics and short courses including Coastal Environmental Impact Assessments and Coastal Regional Planning and Protection of Coastal Areas.

UNIVERSIDAD AUTONOMA DE BAJA CALIFORNIA (UABC)

The UABC has been developing research and academic programs in coastal management in two schools—the Marine Sciences School and the Sciences School. Both are located at the Ensenada Campus.

MARINE SCIENCES SCHOOL

The Marine Sciences School at Ensenada began in 1960. Oceanographic studies and research began at the

bachelor's level with specialities in marine biology, marine chemistry, marine geology, and physical oceanography. In 1985, the master's degree program in Coastal Oceanography was created, and in 1990, the Ph.D. program was initiated. The graduate programs have 42 students at the master's level and eight at the Ph.D. level. At the post-bachelor's level, the school has a one-year certificate program in Marine Resource Management. The two-semester certificate program requires 60 credits (see Table 1) for completion and is divided into required and optional courses.

TABLE 1:
MARINE RESOURCES MANAGEMENT PROGRAM

REQUIRED COURSES	CREDITS	OPTIONAL COURSES	CREDITS
Natural Resources Economics	9	Fisheries Management	9
Organizational Administration	8	Micro/Macro Economics	8
Coastal Zone Management	8	Project Evaluation	8
Seminar	10	Regional Planning	8
		Coastal Management Topics	8

The certificate program has been underway since 1989 and 25 students have graduated and are employed in public administration and private consultancies. In 1991, the Faculty of Marine Sciences sponsored a Latin American Congress on Coastal Zone Management at the Ensenada Campus (March 13-15). More than 400 students and faculty attended; keynote speakers came from the United States, Spain, Ecuador, and Brazil, and researchers from Latin America presented papers. This event helped to start a new research and academic line in the Coastal Oceanography graduate program entitled Coastal Zone Management. In 1994 this concentration supported six students at the master's level and one at the doctoral level. The master's program requires 64 credits (96 credits for the Ph.D.) and a thesis. The program is divided into required and optional courses (see Table 2).

One of the most important elements of the coastal zone management graduate programs in developing countries is that the faculty have the degree and research experience in coastal science, coastal policies, coastal planning, and coastal social problems. This program is supported by a full-time faculty integrated by seven professors (two Ph.D. and five M.S.) and two-part time professors (M.S.) shown in Table 3.

TABLE 2: COASTAL OCEANOGRAPHY GRADUATE PROGRAM (COASTAL MANAGEMENT LINE)

REQUIRED COURSES	CREDITS	OPTIONAL COURSES	CREDITS
Coastal Oceanography I	10	Coastal Policy Analysis	8
Coastal Oceanography II	10	Coastal Regional Planning	8
Thesis Seminar	2	Coastal Hazard Planning	8
		Natural Resources Economics	8
		Coastal Zone Management	6
		Introduction to Coastal Zone	4
		Fisheries Management	6
		Fisheries Economics	8
		Environmental Economics	8
		Coastal Management Topics I	6
		Coastal Management Topics II	6
		Coastal Management Topics III	6
		Coastal Tourism Planning	8

TABLE 3: COASTAL OCEANOGRAPHY FACULTY (COASTAL MANAGEMENT LINE)

<u>FULL-TIME FACULTY</u>	<u>DEGREE</u>
Roberto Enriquez	Ph.D
David Fischer	Ph.D.
Lorenzo Gómez-Morin Fuentes	M.S.
Hector Manzo M.	M.S.
Guillermo Torres Moya	M.S.
Ana Luz Quintanilla	M.S.
José Luis Fermán Almada	M.S.
<u>PART-TIME FACULTY</u>	
Anamária Escofet	M.S.
Carlos Israel Vasquez León	M.S.

SCIENCES SCHOOL

The Sciences School has begun a master's program in Management of Arid Ecosystems which includes topics related to coastal resources management. This program has been in place since 1989 and has produced 25 graduates. The structure of the program is listed in Table 4.

The faculty (see Table 5) is composed of three full-time professors (one Ph.D. and two M.S.), and two part-time professors (one Ph.D. and one M.S.).

This group of professors work together with the faculty of the Marine Sciences School on academic and research projects. The students of one graduate program can take courses in the other in order to enrich the Coastal Zone Management curricula.

TABLE 4: MANAGEMENT OF ARID ECOSYSTEMS (COASTAL MANAGEMENT LINE)

REQUIRED COURSES	CREDITS	OPTIONAL COURSES	CREDITS
Biostatistics	10	Arid resources management	8
Ecology	10	Environmental impact assessment	8
Projects evaluation	8	Socioeconomic topics	8
Thesis Seminar I	4	Geographic information systems in management	8
Thesis Seminar II	4		

TABLE 5: MANAGEMENT OF ARID ECOSYSTEMS FACULTY (COASTAL MANAGEMENT LINE)

<u>FULL-TIME FACULTY</u>	<u>DEGREE</u>
Ileana Espejel Carbajal	Ph.D.
Mayra Franck Hoefflich	M.Sc.
Guillermo Aramburo Vizcarra	M.Sc.
<u>PART-TIME FACULTY</u>	
Pilar Ruiz Azuara	Ph.D.
Anamária Escofet	M.Sc.

FACULTY DEVELOPMENT AND FINANCING

Doctors are working with graduate students at the undergraduate level to help them pursue master of science degrees. The faculty also works to help master's students to move up to a Ph.D. The National Research and Technology Council of México (CONACYT) provides scholarships for undergraduates and M.S. faculty to pursue these higher degrees. In addition, CONACYT funds research projects which partially support graduate students and faculty in order to assist them with thesis research.

The constraint to faculty development is the lack of appropriate Ph.D. faculty to act as mentors for undergraduates and master's-level students. CONACYT has taken a lead role in funding study abroad for Mexican faculty who wish to return to México as university faculty. CONACYT also funds foreign faculty who wish to work one or two years as full-time faculty in México. The emphasis of CONACYT, in this regard, is to facilitate the development of faculty resources for México.

Other sources of financing include government agencies at the state, federal, and international levels that will support research of interest to them. ABC faculty in coastal management have been sought after to propose and conduct research supported by these agencies. At the national level, the results of these projects

have modified coastal planning methodologies and the concept of the coast as an integrated coastal system.

RESEARCH AND SERVICE

As noted, Mexican science and line agencies fund research projects in coastal management. Interdisciplinary planning methodology and products that result from coastal management is of particular interest. UABC has a strong reputation in coastal management research (see Table 6) and attracts both students and funding throughout México.

Besides an emphasis on integrated coastal planning and management programming, UABC faculty in coastal management are developing research themes in environmental impact assessment, energy and technology assessment, hazard mitigation, tourist development planning, port planning, and base line studies of coastal ecosystems.

The research performed by the faculty provides the basis for consulting contracts for government and private entities. Faculty also acts as advisors to legislative communities and other government authorities. To expand the scope of services to coastal organizations, an external advisory council for the coastal management faculty is being considered. The council would assist the faculty in identifying others sources of founding in support of coastal management programs at UABC.

The faculty of the Marine Sciences School and the Sciences School have been working together on academic and research projects since 1991. Most of the projects have been in coastal planning with funding from CONACYT and the federal and state governments.

THE FUTURE: A COASTAL ZONE MANAGEMENT GRADUATE PROGRAM AT UABC, ENSENADA CAMPUS

The experience of the last three years have made it possible for UABC to start implementing a program in coastal zone management that would rest on three fundamental principles:

- An adequate academic paradigm expressing the transdisciplinary integration necessary to encompass the coastal problems encountered
- Recognition by government authorities and coastal industries that students from this program can meet their needs
- Adequate funding levels for academic teaching and research support

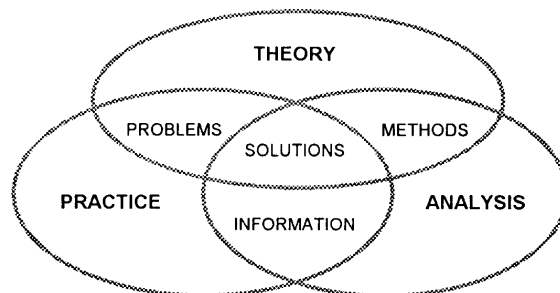
The academic paradigm is that any coastal nation should manage its coastal zone in such a way as to enhance its contributions to society and to the natural, regional, and local economy. In particular, a coastal zone management program should promote a greater knowledge of the coastal zone to include its resources, hazards, and interrelationships; a greater capability for

TABLE 6: RESEARCH PROJECTS (COASTAL MANAGEMENT)

PROJECT	FUNDING BY	PERIOD
Coastal planning in the Punta Banda region, Ensenada, Baja California State, México	Organization of American States O.E.A.	91 -92
Tourism, urban and ecological coastal planning of the Tijuana - Ensenada corridor, Baja California State, México	Federal and state government, the private sector	92 - 93
Environmental mapping of the State of Baja California, México	State government	1993
Aquaculture and ecological coastal planning for the southern coast of Sinaloa State, México	Federal government	93 - 94
Northern Gulf of California and Colorado River Delta biosphere reserve management program	International conservancy	94 - 95
Coastal resources atlas of the northwest coast of Baja California, México	CONACYT (National Research and Technology Council)	94 - 95

understanding and communicating the policy values inherent among the various coastal constituencies; and a greater ability to coordinate and manage the economic choices found within, or affecting, the coastal zone with those at local, regional, and national levels.

To implement such a program, a balanced curriculum will be based on a comprehensive yet integrated set of concepts as follows:



In order for successful approaches to coastal challenges to emerge, this configuration requires a continuing interaction of theory, analysis, and practice grounded in an understanding of the entire coastal zone. The various contributing disciplines are additions to this kind of education rather than ends in and of themselves. Indeed, one can expect disciplinary bound-

aries to lessen as faculty work together in one organizational setting devoted to coastal zone management (Fischer, 1993).

Courses that contribute to a comprehensive yet integrated program should include an orientation to theory as well as to in-depth research into particular cases followed by comparative analysis among cases. This theory-case approach roots coastal zone management in reality, thereby contributing to both useful analysis and sound application. The time scales and processes of nature, culture, technology, and policy require a transdisciplinary effort leading to an acceptable synthesis as the base for managing México's coastal zone.

In order to implement this approach, a coastal zone management curriculum for a master's program (see Table 7) can be created that builds on past successes from the certificate program in Marine Resources Management, the graduate programs in Coastal Oceanography and Arid Ecosystems Management, as well as research experience.

The administration of the master's program and the research in the near future (1995-1996) will be part of the Integrated Coastal Resources Management Center. Through this center, the UABC at Ensenada would formally implement a coastal zone management program resulting from the experience of the faculty in academic and coastal research.

The curricula of the proposed master's program in Coastal Zone Management is divided into required and optional courses. The program requires 64 credits and a thesis. The optional courses define three academic and

research lines—Coastal Planning, Natural Coastal Ecosystems Management, and Coastal Resources Economics.

RECOGNITION BY GOVERNMENT

An important factor is the official recognition of the national value of coastal higher education in México along with an adequate funding base for it to succeed. The coastal problems experienced in México can be resolved only when an adequate number of well-educated coastal professionals address them, and such professionals cannot earn degrees without sufficient funds for the programs involved.

ADEQUATE FUNDING FOR THE MASTER'S PROGRAM

México is in an economic recession and budget cuts are affecting both CONACYT and the state universities. Integrated coastal management education will remain only a distant ideal unless external funding can be found. It is hoped that private foundations and international agencies will be willing to assist Mexican universities such as UABC which have invested so much in ICM.

The needs of the master's program at UABC include:

Faculty: The UABC Ensenada faculty needs support in terms of scholarships and funds in order to finish their degrees (M.S. and Ph.D.) or to finish a thesis project. Some professors have already their Ph.D. credits, so they only need to work on their thesis. Another need is support to bring professors from other universities and other countries to Mexico, in order to enrich our pro-

TABLE 7: MASTER OF SCIENCE IN COASTAL ZONE MANAGEMENT AT UABC ENSENADA CAMPUS INTEGRATED COASTAL RESOURCES MANAGEMENT CENTER

REQUIRED COURSES

<u>Courses</u>	<u>Credits</u>
Introduction to Coastal Zone Management	6
Thesis Seminar I	2
Thesis Seminar II	2

OPTIONAL COURSES

Coastal Planning		Natural Coastal Ecosystems Management		Coastal Resources Economics	
<u>Courses</u>	<u>Credits</u>	<u>Courses</u>	<u>Credits</u>	<u>Courses</u>	<u>Credits</u>
Coastal Zone Management	8	Coastal Zone Management	8	Coastal Zone Management	8
Regional Planning	8	Regional Planning	8	Regional Planning	8
Coastal Policy Analysis	8	Coastal Policy Analysis	8	Coastal Policy Analysis	8
Planning for Coastal Hazard	8	Environmental Impact Assessment	8	Natural Resources Economics	8
Planning for Coastal Tourism	9	Coastal Ecosystems Management	8	Fisheries Economics	8
G.I.S. in Management	8	Fisheries Management	6	Topics on Socioeconomic Issues	8
Topics on Socioeconomic Issues	8	G.I.S. in Management	8	Environmental Economics	8
Topics on Coastal Management I	6	Topics on Coastal Management II	6	Topics on Coastal Management III	6

gram with experiences in coastal management from different parts of the world.

Students: In order to get full-time students into the master's program, scholarship support will be necessary.

Integrated Coastal Resources Management Center:

By the middle of 1997, this center will need funds for administration, computer software and equipment, the acquisition of books and journals (a small library), and money to build a small building.

REFERENCES

Fischer, D.W. (1983). *In pursuit of excellence in coastal zone studies at the University of West Florida*. Unpublished manuscript, University of West Florida, Pensacola.

Fischer, D.W. (1993). Coastal higher education in México. In J.L. Fermán Almada, L. Gómez-Morin y D. W. Fischer (Eds): *Coastal management in Mexico*, (pp. 148-155). New York, NY: American society of civil engineers.

Toledo, A. (1993). La Zona Costera del Pacífico Sur: Un Ecosistema Amenazado. *Boletín de Humedales Costeros de México*, 1(3), 8-16.

West N. (1986). Graduate education in marine affairs: A preliminary assessment. *Marine Technology Society Journal*, 20, 11-20.

West N. (1987). *International coastal zone education*. Unpublished manuscript, University of Rhode Island, International Coastal Resources management project, Narragansett.

INTERDISCIPLINARY EDUCATION WITH CONSIDERATION FOR COASTAL MANAGEMENT

Elizabeth Fuller

Coastal Resources Center
University of Rhode Island
Narragansett, RI, USA

ABSTRACT

Knowledge from multiple disciplines, such as geography, economics, sociology, and physical sciences, can benefit coastal managers. However, which information should be provided to whom, and how should that material be conveyed? As the first step in their training, people who hope to become coastal management practitioners should establish a professional identity or specialty and pursue training that allows them to apply that chosen discipline to coastal management. An institutional structure well suited to this mode of education would be to create interdisciplinary studies departments that offer a specialty in coastal management.

INTRODUCTION

Interdisciplinary education is often proposed as the solution to the dilemma of how to educate coastal managers. Coastal managers work to bring order to a region that, in a global context, is the site of a rapid increase of human population and that hosts a significant concentration of natural resources and industrial development. With such an amalgam of issues, it is clear that knowledge from multiple disciplines, such as geography, economics, sociology, and physical sciences, would benefit coastal managers. However, which information should be provided to whom and how should that material be conveyed? This paper seeks to address the "how". An overview of issues in interdisciplinary education is followed by examples of effective approaches from other fields. The paper concludes with three options for establishing institutional arrangements for the support of interdisciplinary education and recommendations for coastal management education.

A discipline is a domain of knowledge or competence within a society (Gardner and Boix-Mansilla, 1994). Each discipline addresses intellectual issues in an established, formal manner and entails particular modes of thinking about or interpreting the world (Gardner and Boix-Mansilla, 1994). Characterized by four features, disciplines:

- Are established to investigate a special subject of study or particular problem (i.e., the humanities focus on the study of expressive and constitutive cultural forms)
- Generate theories to address their subjects or particular problems (i.e., the theory of evolution is fundamental to the study of genetics)
- Evolve and approve their own methods and techniques (i.e., an anthropologist accepts ethnographic interviews as a valid technique to elicit cultural information from a group)
- Accumulate and return information to their own database i.e., the discipline builds on a foundation of past research (Sutlive, 1989).

Based on these definitions, coastal management cannot be accepted as a discipline. The "special subject" that coastal managers investigate and the management of coastal ecosystems, is a specialization within many disciplines rather than a discipline unto itself. To date there are no accepted theories, methods, or techniques for conducting coastal management research or field projects. A database of coastal management research is beginning to be developed. However, there is very little documentation of some of the longest-running coastal management projects, and what

has been published tends to be more anecdotal than empirical.

Coastal management is not a discipline, yet it requires input from many disciplines. Therefore, is it better to train individuals as specialists in particular fields and hope they can communicate and work with specialists from other disciplines later in their careers? Or should individuals be trained so that they become knowledgeable about the great breadth of issues confronted by coastal managers? Interdisciplinary education is the form of instruction necessary to produce this second type of professional.

INTERDISCIPLINARY EDUCATION

Interdisciplinary education is "centered on a problem, theme, or issue designed to integrate the knowledge and perspectives of several traditional disciplines" (Alkin, 1992). It addresses the need for specialized knowledge across a range of fields. Interdisciplinary education can be applied to a single class, a year-long project, or an academic degree program. Classes may be team taught or developed with the input of faculty representing different disciplines. Guest lecturers and clinical experience are common features of interdisciplinary education.

Interdisciplinary education is often criticized for lacking academic rigor (Shanker, 1995.). Roth (1994) complains that it "does not focus on the powerful ideas or organizing concepts from the disciplines", the concepts are selected for reasons other than their utility to a discipline, and proper consideration is not given to what is most valuable for students to learn. Sbaratta objects that "combining more than one discipline in a course weakens each of the disciplines" (1983) and that team teaching is often ineffective because of a lack of understanding and respect among faculty from different departments. Each of these objections is valid but not necessary. The School of Interdisciplinary Studies at Miami University provides an excellent example of how effective interdisciplinary education can be when approached with an open mind and the high expectations of both faculty and students.

The School of Interdisciplinary Studies is one of the premier undergraduate interdisciplinary programs in the United States. The intent of the program is to "challenge students' unexamined assumptions about themselves and their world, on the limitations as well as the strengths of each discipline, and [to develop] a holistic understanding informed by materials from various disciplines" (Newell, 1992). The program at Miami has addressed and found solutions to each of the objections described above. First of all, there is an emphasis on disciplinary analysis. Newell (1992) proposes that if students are to develop a feel for a discipline's perspective, they must learn to think like a practitioner of that discipline. Members of a discipline are not so

much characterized by the conclusions they arrive at, but by the way they approach the topic—the questions they ask, the concepts that come to mind, and the theories behind them.

Rather than learning all aspects and facets of a single discipline, students are encouraged to confront a topic from multiple perspectives by reading illustrative readings from several disciplines that offer contrasting views of the same topic. For any given course, students learn enough about a discipline to appreciate its perspective and goals. The concepts theories and methods from various disciplines are presented with exactly the same rigor as in traditional disciplinary courses (Newell, 1992). The cumulative effect of a four year baccalaureate program is that students are able to draw from many different disciplinary bases.

Classes are usually team-developed and occasionally team-taught. For this approach to be effective, it is essential that the faculty have faith in the expertise of their colleagues as well as an appreciation for the perspective of the other discipline(s). When recruiting faculty, the School of Interdisciplinary Studies has found that the depth and rigor of the candidates' postgraduate education is more important than its breadth. The key to successful interdisciplinary teaching is a "willingness, and preferably eagerness, to learn other perspectives" (Newell, 1992).

Miami University has found that the graduates of its School of Interdisciplinary Studies, as indicated by graduate placements and standardized test scores, are well equipped with the traditional intellectual skills, attitudes, and values necessary for advanced disciplinary studies and/or careers. The proportion of Interdisciplinary Studies students to go on to doctoral programs in disciplinary postgraduate schools is higher than the national average. The average percentile ranking on the Law School Admission Test for Interdisciplinary Studies students is 85.7 percent. Interdisciplinary Studies students also perform well on the Graduate Record Exam (Newell, 1992).

The example from Miami University demonstrates that interdisciplinary education is a valid and effective form of education. Students learn "multilogical thinking—the ability to think accurately and fair-mindedly within opposing points of view and contradictory frames of reference—as well as the ability to enter sympathetically into and reconstruct the strongest arguments for points of view fundamentally opposed to their own" (Newell, 1992). In other words, students are trained to understand, appreciate, and be conversant in multiple disciplines.

The field of geriatrics, the study and practice of medicine as it relates to old age, has adopted interdisciplinary techniques to produce health care professionals who are capable of working together in collaborative efforts. Like coastal management, geriatrics requires the

input of specialists from many different disciplines. Gerontologists must address issues associated with "increased economic dependence, narrowed social interactions, geographic confinement, decreased mental stimulation, and increased psychological stress due to disability, pain and imminent death" as well as acute and chronic diseases (Shepard et al., 1985). Proper patient care requires that health care professionals "understand the presence and interrelatedness of these problems and...understand each others' roles and the interface of these roles among team members" (Shepard et al. 1985, 300).

The Administration on Aging has been funding university and college-based geriatrics training programs under the Older Americans Act since 1967. After more than a decade of experience, a substantial amount of literature concerning different approaches to geriatric education was published in the early- to mid-1980s. The primary questions being asked concerned "which students to include at what levels of education and which topics should be taught by whom" (Shepard et al., 1985). The types of issues that geriatric care educators faced then, coastal managers are facing now. Other similarities between the two fields include disparities in academic backgrounds and personal goals that individuals bring to both fields, the great demand for experts in both fields, and the traditional emphasis in both fields on treating acute illness/problems rather than adopting a more holistic approach to management (whether it be management of health care or coastal ecosystems).

Over the years, gerontologists have come to accept interdisciplinary education as dictum (Yeo, 1995, pers. comm.). Because of the numerous parallels between coastal management and geriatric medicine, it is useful to investigate which aspects of interdisciplinary education proved to be most useful for training health care professionals to work as team members caring for elderly patients. The advice listed below has been culled primarily, but not exclusively, from reviews of geriatric education programs. It may not all be applicable to coastal management education. At a minimum, the information provides an opportunity for careful consideration as coastal management educators prepare to further develop existing programs and/or to create new ones.

- Interdisciplinary education must be the highest or one of the highest priorities of the program (Satin, 1987).
- The authority controlling the education program must understand and be committed to interdisciplinary education. Procure the support of educational authorities such as presidents, deans, department chairs, and directors of funding agencies (Satin, 1987).
- Honesty, trust, and respect among participants is essential to interdisciplinary education. It is only in such

an atmosphere that people within a discipline can communicate their values, knowledge, and skills, and learn those of other disciplines (Satin, 1987).

- Real or simulated clinical and nonclinical experience is necessary (Shepard et al., 1985).
- Topics such as financing, government regulations, and delivery systems lend themselves to interdisciplinary curricula (Shepard et al., 1985).
- Short experiences in interdisciplinary education given over the entire span of professional training appear to be more effective in yielding long-term behavioral changes than an intensive onetime experience (Shepard et al., 1985).
- Using peer teachers is an effective way to break down barriers and initiate and reinforce collaborative activities (Shepard et al., 1985).
- A multidisciplinary master's degree was proven to be a better vehicle for an "applied" program than a disciplinary or professional school degree (Friedsam and Martin, 1980).
- The faculty must be competent in their own disciplines and conversant with, and appreciative of, the positions of their fellows (Sutlive, 1989).
- Consult with the faculty of disciplines which would be affected by the interdisciplinary programs before the initiation of courses or programs. Refer material normally covered by another department to members of that department for comment (Sutlive, 1989).
- Avoid a "least common denominator" approach. Students should be recipients of provocative lectures and engage in seminars that deal with complex controversies (Shepard et al., 1985).
- Because graduates will have to work collaboratively as professionals, formal coursework in organizational dynamics should include topics such as team problem-solving techniques, goal setting based on consensual decision making, leadership styles, and conflict resolution (Shepard et al., 1985).
- Maintain contact with the industry. Hire a practitioner with a national reputation as a member of the core faculty; seek feedback on the curricula from preceptors and employers of the graduates; faculty members should attend meetings of practitioners as well as discipline-specific meetings; and keep in touch with graduates after they become practitioners (Friedsam and Martin, 1980).
- Interdisciplinary education threatens vested interests. Therefore, establish interdisciplinary education programs as autonomous units within educational institutions (Satin, 1987).

- Resources of money, time, and good will are necessary for the success of an interdisciplinary education program. Make the program self-sustaining. Self-sufficiency will increase both the practical and ideological support of educational authorities (Satin, 1987).
- Coursework in the biological and physical sciences is not well suited to interdisciplinary education (Shepard et al., 1985).
- Establishing a student's professional identity must precede clinical interdisciplinary education (Shepard et al., 1985).
- Specializations within the multidisciplinary program proved beneficial (Friedsam and Martin, 1980).
- Interdisciplinary courses must be taught by educators representing all of the disciplines of the students involved (Shepard et al., 1985).
- Provide "postgraduate work fellowships" to give recent graduates an opportunity to gain professional experience (Mangum and Rich, 1980).
- Guest lecturers with a wide variety of education and experience can make significant contributions (Sutlive, 1989).
- Sutlive (1989) perceives that there are two ways to teach interdisciplinary courses. There is either one instructor with education in a second field beyond his or her major professional discipline, or the class is team taught by instructors from different disciplines. Problems arise with the first approach when the instructor is not sufficiently versed in the secondary discipline. Problems arise in the team-taught approach when participants are not conversant with, or appreciative of, the positions of their colleagues; when they understand one another's models, methods and theories only minimally.
- Classes must be held at times and locations that are accessible to students (Shepard et al., 1985).
- Be flexible, creative, persistent, and committed (Satin, 1987).

Other issues to consider when developing coastal management education programs relate to institutional arrangements. If an educational approach is adopted that relies in part or in full on interdisciplinary education, where will that unit be housed within any given university or college? At least three options exist: establish an academic center or institute, promote facilitative units, or create a Department of Interdisciplinary Studies.

INSTITUTIONAL ARRANGEMENTS

Stahler and Tash (1994) investigated the role of academic centers and institutes at the fastest growing research universities in the United States. Research

centers and institutes refer to any number of academic organizational entities whose primary mission is to conduct research. Despite criticism that centers often do not contribute to the educational mission of universities, Stahler and Tash (1994) found that the largest funded centers at the fastest-growing universities typically complemented and enhanced the academic role of departments. They appeared to engage in considerable interdepartmental activity and, at the same time, were fairly well integrated to a lead department, so that they supported and enhanced the research and even the teaching roles of the departments.

Other benefits of centers include substantial access to sophisticated equipment, graduate student and administrative support, and the capability to respond flexibly and rapidly to sponsor's requests.

McCall (1990, 1319) describes a facilitative unit that was established at the University of Pittsburgh to "promote interdisciplinary research and education within the university and to facilitate mutually beneficial relations between the university faculty and human service providers and policy makers." A major function of such a unit is to be the touchstone between faculty and the community. Rather than creating a new department or center, the facilitative unit draws on the strength of existing departments to fill a need or create a solution to an issue requiring knowledge from multiple disciplines. The concept is intriguing, and McCall offers seemingly excellent advice on developing an integrating theme (it must cut across numerous traditional academic disciplines and have relevance for a substantial number of applied professionals and social issues); building a base of support (the emphasis must be on service); securing funding (ideally, funds should be contributed from the institutions that represent the unit's constituencies—the university, the human service [or coastal management] providers, and the policy makers in the community); hiring a staff (collectively, the staff needs to have experience with interdisciplinary research and training, applied research and evaluation, policy formulation, and professional services); and planning programs and projects (preliminaries, facilitating collaboration, identifying specific projects, and managing special projects).

Sbaratta (1983) describes the Department of Interdisciplinary Studies at North Shore Community College (United States). The department was developed by a core group of faculty who were interested in dismantling the barriers between traditional disciplines. The department is home to courses that embrace a variety of organizational and methodological strategies such as team-teaching, multi-discipline courses taught by one individual, thematic courses, and discipline combinations. The classes are cross-listed in appropriate departments, and the faculty in the Department of Interdisciplinary Studies have dual academic citizenship.

Courses are evaluated within the Department of Interdisciplinary Studies for their merits as interdisciplinary offerings. Representatives of traditional disciplines scrutinize course content to protect the academic integrity of specific disciplines (Sbaratta, 1983). The Department of Interdisciplinary Studies has built a neutral ground on which faculty from different disciplines can convene and from which special interests, talents, and expertise that do not fit the traditional discipline mold can be expressed.

RECOMMENDATIONS

It is accepted practice to train geriatric health care workers through interdisciplinary course work that augments their discipline-specific studies. This indicates that an interdisciplinary approach is an effective method of training practitioners for careers in fields that require inputs from multiple disciplines. As the first step in their training, people who hope to become coastal management practitioners should establish a professional identity or a specialty. Once a person identifies him or herself as a planner, a communications specialist, a lawyer, an administrator, or a host of other possibilities, then he or she can pursue training that allows for the practical application of that chosen discipline to coastal management. Because of the emphasis on education, rather than research or service, departments of interdisciplinary studies that offer a specialty in coastal management provide an institutional structure that is well suited to this mode of education. Students from such disparate disciplines as biology, political science, and education could register for courses such as

- Communicating for Policy Change
- Compiling and Analyzing Monitoring Data for Management Decisions
- The Science and Policy of Beach Management

These interdisciplinary courses emphasize skill development and use. Faculty should be drawn from appropriate academic departments and be willing and able to incorporate material from multiple disciplines into a single course. Students could be selected from baccalaureate, master's, or doctoral-level candidates and should have exposure to interdisciplinary education throughout the entire span of their professional training.

REFERENCES

- Alkin, M.C. (Ed.). (1992). *Encyclopedia of educational research*. New York: Macmillan.
- Begala, J.A. (1980). Geriatric education in Ohio: A model for change. *The Gerontologist*, 20, 547-551.
- Cross, B.E. (1994). Global issues in curriculum development. *Peabody Journal of Education*, 69, 131-140.
- Friedsam, H.J. & Martin, C.A. (1980). An applied program in social gerontology: A report on ten years' experience. *The Gerontologist*, 20, 514-518.
- Gardner, H. & Boix-Mansilla, V. (1994). Teaching for understanding in the disciplines—and beyond. *Teachers College Record*, 96, 198-218.
- Mangum, W.P. & Rich, T.A. (1980). Ten years of career training in gerontology: The University of South Florida Experience. *The Gerontologist*, 20, 519-525.
- McCall, R.B. (1990). Promoting interdisciplinary and Faculty-Service-Provider relations. *American Psychologist*, 45, 1319-1324.
- Newell, W.H. (1992). Academic disciplines and undergraduate interdisciplinary education: Lessons from the School of Interdisciplinary Studies at Miami University, Ohio. *European Journal of Education*, 27, 211-221.
- Roth, K. (1994). Second thoughts about interdisciplinary studies. *American Educator*, 18, 44-48.
- Satin, D.G. (1987). The difficulties of interdisciplinary education: Lessons from three failures and a success. *Educational Gerontology*, 13, 53-69.
- Sbaratta, P.A. (1983). Defeating the learned ignoramus. *Community College Review*, 10, 33-39.
- Shanker, A. (1995). Disciplinary learning. *New York Times*. February 5, 1995, E7.
- Shepard, K., Yeo, G. & McGann, L. (1985). Successful components of interdisciplinary education. *Journal of Allied Health*, 14, 297-303.
- Stahler, G.J. & Tash, W.R. (1994). Centers and institutes in the Research University. *Journal of Higher Education*, 65, 540-554.
- Sutlive Jr., V.H. (1989). Breakthrough or babble: Communication or confusion in interdisciplinary education. *Urban Anthropology and Studies of Cultural Systems and World Economic Development*, 18, 95-109.

MEETING THE CHALLENGE: THE MARINE STUDIES PROGRAMME AT THE UNIVERSITY OF THE SOUTH PACIFIC

G. Robin South

Joeli Veitayaki

Marine Studies Programme

The University of the South Pacific

Suva, Fiji

ABSTRACT

There is a major shortage in technical and management skills in the marine sector in all Pacific Island states served by the University of the South Pacific (USP). This situation is exacerbated by the enormous increase in responsibilities faced by Pacific Island countries in the management and development of their coastal regions imposed by the enactment of the Law of the Sea and as a result of the United Nations Conference on Environment and Development (UNCED). In response, USP has introduced an interdisciplinary, university-wide Marine Studies Programme and has placed a priority on its development. Various strategies are being adopted. In the long term, the program is focusing on undergraduate certificate, diploma, or degree programs that will provide a large number of graduates with at least some training and awareness in issues relating to coastal and ocean resources management, development of specialized degrees in Marine Science and Marine Affairs (to be introduced in 1996), and encouragement of postgraduate training at the master's and doctoral levels. USP has an advantage in its well-developed Distance Education network throughout the South Pacific region. Certificates are offered through 11 Extension Centres. Through its Marine Public Education Programme, the University is concentrating on improving the marine-related content in school curricula and in upgrading teachers' skills in marine science through the initiation of a training-of-the-trainers curriculum development program. The University is reaching the most important players in the coastal seminars. The University recognizes the importance of networking in its training. The Institute's Operational Centre (IOI-South Pacific) is to be networked through the new UN/DOALOS TRAIN-SEA-COAST Project. Training courses offered through IOI and TSC will provide the highly professional, job-related training that is urgently needed in the South Pacific region.

INTRODUCTION

Established in 1969, the University of the South Pacific (USP) serves 12 island nations scattered over 22 million km² of the South Pacific Ocean (Solomon Islands, Vanuatu, Tuvalu, Nauru, Marshall Islands, Kiribati, Western Samoa, Tokelau, Fiji, Tonga, Niue, and Cook Islands). The people of this vast region are wedded to the sea by tradition, by history, and by geography, and they have relied on its seemingly endless resources for their daily nutrition since their ancestors spread from west to east on their epic migratory journeys. With their exclusive economic zones established

as a result of the Law of the Sea Convention, the territory of these small nations has been enormously increased during the past decade. While this new wealth is largely untapped, the burden that it places on its custodians is overwhelming. This responsibility combined with growing population pressures and the consequent pollution of sensitive coastal environments, increases in tourism, greater pressures on the traditional fishery of reefs and lagoons, lucrative opportunities to give distant water fleets access to the deep sea fishery of their economic zones, dwindling resources, an emphasis on economic development focusing on ocean resources,

the development of new technology, such as aquaculture, and energy production from the sea, has led to an unprecedented expansion of activities in all aspects of the marine environment.

USP is one of four main universities located in the tropical South Pacific. The others are the University of Papua New Guinea, the University of Technology at Lae, Papua New Guinea, and the Université Française du Pacifique (UFP). Tertiary institutions providing tertiary training and educational opportunities to Pacific Islanders in the marine field include the University of Guam, the University of Hawaii, Nelson Polytechnic, the Australian Maritime College, and others.

USP is in a unique position to lead the way in the development of a comprehensive program in marine studies, yet it is remarkable that it was not until 1986 that the necessary initiative was taken and the Ocean Resources Management Programme was established as a joint project with the Forum Fisheries Agency. Serious planning for the development of a Marine Studies Programme began in 1990 with the appointment of a professor of Marine Studies. In 1993, USP established its Marine Studies Programme (MSP) as an interdisciplinary, university-wide program focusing on education, research training, and service to its member countries. For the next several years, the University Grants Committee will provide additional funding to Marine Studies, recognizing it as an area of high priority for development.

The mission for the Marine Studies programme is broad, as is the subject itself.

- It will provide the necessary opportunities for Pacific Islanders to understand, conserve, develop, manage, and utilize their living and nonliving marine resources in a rapidly changing world
- It will provide Pacific Islanders with the widest possible range of opportunities for research, education, training, and employment in the marine sector.
- It will provide for better collaboration between USP, island nations, regional and international bodies with their common goals in the marine sector.

The goals of MSP are to:

- Play a role in the dissemination of information on all aspects of marine studies to schools, the general public, regional governments and agencies, and the academic community
- Spearhead the development of an appropriate forum where the development of marine programs can be achieved through cooperation
- Strengthen the University's role as the principal regional tertiary institution by providing appropriate educational programs to serve the social and economic development of the region in the marine sector

- Provide research and development opportunities to serve the marine-based industries and governments of the region, particularly in the areas of living and nonliving marine resources
- Provide opportunities for technical, professional, and in-service training in marine affairs
- Provide expert consultancy services in a range of marine fields to support government, industry, and education
- Improve existing and develop new resources (facilities, services, institutes, and personnel) in support of the marine studies program
- Strengthen existing linkages and develop new formal and informal linkages with regional, national, and international bodies in the marine sector
- Improve the quality and scope of part-time and distance education in marine topics to better serve the emerging needs of working adult learners

The MSP currently coordinates the following programs and activities:

- The Ocean Resources Management Programme (ORMP: located in the School of Social and Economic Development)
- The Atoll Research Programme (Tarawa, Kiribati)
- The Dravuni Island Field Station, Kadavu Islands, Fiji (in collaboration with Astrolabe, Inc., based in Washington, D.C.)
- The Pacific Islands Marine Resources Information System (PIMRIS: Coordination Unit located in the USP Library)
- The Marine Public Education Programme (in collaboration with the Institute of Education)
- The International Ocean Institute Operational Centre at the University of the South Pacific (IOI-South Pacific)

STRATEGY

Human resources surveys in the South Pacific region have revealed that there is a major shortage in technical as well as management skills in the marine sector in all countries, including those government departments responsible for ocean and coastal management. At present, the majority of the personnel employed in the middle and senior positions (i.e., the decision makers) have, at most, a bachelor's degree. Very few are trained to the master's level or above.

This situation is exacerbated by the enormous increase in responsibilities faced by Pacific Island countries in the management and development of their coastal regions. These mostly newly-independent coun-

tries control huge Exclusive Economic Zones (EEZ) and, at the same time, they are major participants in new developments at the global level resulting from the Law of the Sea coming into force and the various developments resulting from the United Nations Conference on Environment and Development II (UNCED). While they are assisted, in part, by (largely) expatriate experts who are employed by the various regional organizations in the South Pacific, they are very conscious of the need to become self-sufficient and of the marked shortfall in human resources and expertise that they face. Most of the Pacific Island nations are small islands, they have small populations, and the vast majority of the people live on the coast and rely on its resources for their nutrition and survival. For these reasons, it is clear that human resource development in the area of coastal management is a high priority.

It is against this background that USP's Marine Studies Programme is being developed. There are two parallel strategies being adopted. The first is long-term, focusing on the development of certificate, diploma, and undergraduate degree programs that will provide a large number of graduates with at least some training and awareness in issues relating to coastal and ocean resources management. This strategy is geared to the fact that the career goal in most Pacific Island governments is at the bachelor's level. A smaller group of the best graduates is being encouraged to undertake postgraduate degrees, where developing the appropriate technical skills is emphasized.

The second strategy is short-term, aimed at reaching the most important players in the coastal management decision-making process through workshops, seminars, and short-term training. From 1986 to 1990, the University's Ocean Resources Management Programme conducted six in-country workshops on ocean resources management throughout the South Pacific region. More recently, the University's Marine Public Education Programme has been concentrating on improving the marine-related content in school curricula and upgrading teachers' skills in marine science by initiating training of the trainers curriculum development program. USP's institutes are playing an important role in this process and, in particular, the International Ocean Institute Operational Centre at USP (IOI-South Pacific). One opportunity that is being exploited by the University is the availability of distance learning through 12 centers operating throughout the region. In particular, certificates and diplomas are now being offered by Extension, thus enabling individuals to enroll in part-time study programs while still employed.

ORGANIZATION

The organization of the programs and activities are shown in Figure 1. Academic Programmes (undergraduate and postgraduate degrees) are offered under the

aegis of the Schools, while short-term courses and training are offered through the IOI-South Pacific.

Undergraduate programmes are structured in such a way that students can progress from certificate and diploma programs, to undergraduate and postgraduate degrees through the following steps:

Step 1: Certificates (see Table 1)

Certificate in Tropical Fisheries

Certificate in Ocean Resources Management

Each of these certificates comprises six courses and can be completed in a full year on campus or over a longer period through Extension. An additional certificate, the Certificate in Earth Science and Marine Geology is offered at the sub-degree level in collaboration with the South Pacific Applied Geoscience Commission. This targets technicians, for example, in regional government departments of mineral resources.

Step 2: Diplomas (see Table 2)

Credits from the degree-level certificates can be carried over toward the completion of the following diplomas, which require a total of 12 credits

Diploma in Tropical Fisheries—the School of Pure and Applied Sciences (SPAS)

Diploma in Ocean Resources Management (the School of Social and Economic Development)

Diploma in Fisheries Economics and Management in the School of Social and Economic Development (SSED)

Step 3: Bachelor's Degrees

In science, undergraduate students may include up to eight courses focusing on marine topics as part of their bachelor's degree. There are plans to introduce a bachelor of science major in marine science starting in 1996.

In the social sciences, students may complete all four courses in the ORMP programme, together with appropriately related courses from other SSED departments, to complete their bachelor's degree. There are plans to introduce a bachelor's degree majoring in marine studies in 1996.

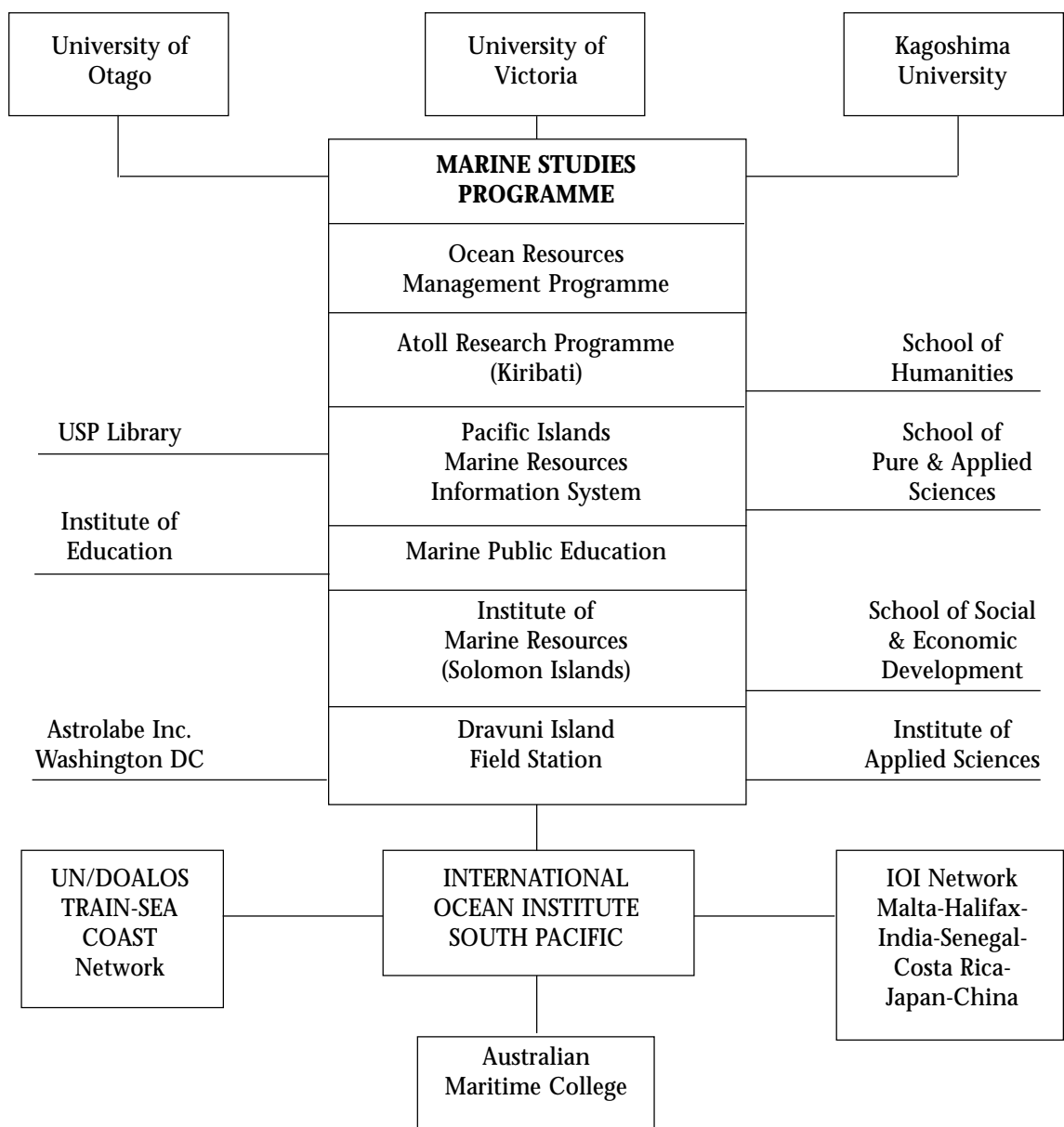
Step 4: Postgraduate degrees

At the postgraduate level, students may earn a postgraduate diploma, an M.S. and Ph.D in Marine Studies. The M.S. and Ph.D. degrees are based on substantive supervised research topics with a thesis, and may focus on areas relevant to coastal management.

THE INTERNATIONAL OCEAN INSTITUTE (IOI)

In 1993, USP became a member of the IOI network. Established in 1972, with its headquarters in Malta, the IOI is an international nongovernmental organization registered in Rotterdam, The Netherlands. The IOI has

Figure 1. The Program Components and Institutional Linkages of the University of the South Pacific Marine Studies Programme



a broad mandate for training, research, and development in the ocean sector. One of its core activities has been to develop and run training programs focusing on ocean affairs and the Law of the Sea. There are now more than 1,000 alumni worldwide, especially in developing countries, who have successfully completed IOI courses. With funding from the UNDP (Global Environment Facility), the IOI embarked on a globalization program in 1993 and established operational centers in four countries: Fiji, India, Senegal, and Costa Rica. Since then, more centers have joined the network and others are planned (see Fig. 1). In Fiji, IOI-South Pacific operates under a Memorandum of Agreement

with USP and under a Memorandum of Understanding with the Government of Fiji.

The partnership between IOI and USP is proving highly beneficial to the development of courses and programmes, especially in the Ocean Resources Management Programme. Approved courses presently available or under development by IOI-South Pacific are:

- Management and Development of Coastal Fisheries (five-week course, first offered in October 1994)
- Resource and Environmental Economics (five-week course to be offered in July 1995)

**TABLE 1: MARINE STUDIES PROGRAMME
CERTIFICATES**

CERTIFICATE IN TROPICAL FISHERIES

BIF02	Foundation Biology A
BIF03	Foundation Biology B
CS121	Introduction to Information Technology
MA131	Basic Statistics
UU111	Introduction to Marine Science for Pacific Islands
UU201	Introduction to Ocean Resources Management

**CERTIFICATE IN OCEAN RESOURCES
MANAGEMENT**

CS121	Introduction to Information Technology
EC100	Introduction to Economics
MG101	Introduction to Management
UU111	Introduction to Marine Science for Pacific Islands
UU201	Introduction to Ocean Resources Management
and ONE of the following:	
HP101	Government & Public Policy in the South Pacific
HP102	Contemporary History
PS171	Introduction to Psychology
SE101	Introduction to Population Studies
SE103	Principles & Problems of Land Tenure
SO100	The Study of Society

**CERTIFICATE IN EARTH SCIENCE
& MARINE GEOLOGY ¹**
(Pre-degree level)

SCC01	Basic Earth Science & Marine Geology
SCC21	Earth Materials
SCC22	Marine Geology & Earth History
SCC23	Earth Resources & Mapping
SCC24	Earth Science in Development Projects
SSC25	Hydrology & Hydrogeology

**TABLE 2: MARINE STUDIES PROGRAMME
DIPLOMAS**

(The diploma consists of 12 courses, including six cross-credited from the appropriate certificate)

DIPLOMA IN TROPICAL FISHERIES

Certificate in Tropical Fisheries
plus

BI201	Population Biology
BI202	Invertebrate Biology
UU201	Introduction to Ocean Resources Management
UU203	Fisheries Economics & Management
BI305	Marine Biology
BI307	Fish & Fisheries Biology

**DIPLOMA IN OCEAN RESOURCES
MANAGEMENT AND POLICY**

Certificate in Ocean Resources Management
plus

UU203	Fisheries Economics & Management
UU301	Ocean Resources Management in the South Pacific

plus 4 from options under
the Certificate, and

GE102	Introduction to Human Geography
SO201	Society, Culture & Change in the Pacific
SO205	Sociology of Resources Management and Development

**DIPLOMA IN FISHERIES ECONOMICS
AND MANAGEMENT**

Certificate in Ocean Resources Management
plus

EC101	Macroeconomics I
EC102	Microeconomics I
UU203	Fisheries Economics & Management
UU301	Ocean Resource Management in the South Pacific

plus 2 from options under
the Certificate, and

EC203	Economic Statistics
GE203	Social & Economic Geography of the World
HP200	The Politics of Developing Countries
MG206	Marketing in Developing Countries
SO205	Sociology of Resources Management and Development

- Fisheries Economics and Management (five-week course to be offered in 1996)

With the assistance of the UNDP/Division for Ocean Affairs and the Law of the Sea (DOALOS) and IOI, USP/IOI-South Pacific course developers have received training (1993 and 1995) in the TRAIN-X methodology. These courses are in the process of being fully adapted according to this system.

TRAIN-SEA-COAST PROGRAMME

In 1995, IOI-South Pacific and MSP were invited to join the TRAIN-SEA-COAST PROGRAMME (TSC). This program has been developed by the UN/DOALOS under the guidance of Stella Maris Vallejo. TSC is a network of nine UN, IOI, and other training centres dedicated to the development of up to 14 courses/modules that are designed to train coastal managers and planners. It is a direct response to UNCED and AGENDA 21, Chapter 17 of the Rio Conference. The courses/modules will be developed according to the TRAIN-X methodology, and a new training manual was developed specifically for this purpose by the TRAIN-X network. The first meeting of the network participants took place at Stony Brook, NY in January 1995, when 21 participants received intensive training in the TRAIN-X methodology.

IOI-South Pacific will be engaged in the development of three of the courses under TSC namely:

- Sustainable Management of Coastal Fisheries in the Tropics
- Resources and Environmental Economics
- Ocean Governance with specific reference to Small Island Developing States (SIDS) (to be developed jointly with the University of Wales, Cardiff, UK)

The above courses will target middle to upper-level management in government and planners and users at various levels in the marine sector. The courses/modules will greatly enhance IOI-South Pacific's and hence USP's capabilities in the delivery of appropriate education and training to its island country members. In addition, through exchange of courses with the other members of the TSC network, USP will gain access to a much wider selection of training materials for the overall benefit of its member countries. Membership of the TSC network will further enhance USP's overall networking in the marine training sector. Building on the existing networks within the IOI system, USP will also provide access to a proven training methodology through the TRAIN-X system.

FUTURE PLANS

Certificates are currently available by Extension. Given the large size of the USP region, and the fact that many who wish to undertake programs in marine

studies may already be in the work-force, it is hoped that the two diplomas offered by SSED (Ocean Resources Management and Policy, and Fisheries Economics and Management) will be available entirely by Extension as well as on campus. The introduction of undergraduate degrees at the bachelor's level, specializing in Marine Science (SPAS) or Marine Studies (SSED), is planned for the 1996 academic year onwards.

Providing that adequate funding can be secured, it is expected that postgraduate degree programs (postgraduate diploma, master's and doctoral levels) will continue to expand at a moderate rate. Wherever possible, USP and IOI-South Pacific will explore linkages with other institutions worldwide, where these can be of demonstrated mutual advantage, emphasizing education, training, and research in marine studies.

It is anticipated that IOI-South Pacific will continue its association with the Marine Studies Programme at USP and that the MSP's involvement in the TSC Network will become an integral part of the University's involvement in training at the regional, subregional, and international levels. Above all, the University recognizes the importance of participating in marine education and training networks. It cannot work in isolation of the world community. Training in the area of Integrated Coastal Management is of paramount importance to all the people of the South Pacific region, and USP is glad to have the opportunity to collaborate with other institutions to ensure that its programs are relevant and meet the needs of these countries in the 21st century.

Through the IOI-South Pacific and other USP institutes, the development of specific training packages for clearly identified target groups will continue. Capabilities exist for the development of seminars, workshops and training packages ranging from one day to five weeks.

ACKNOWLEDGMENT

We are grateful for the financial assistance of the Canadian International Development Agency (CIDA), the United Nations Development Programme (UNDP), the Government of France, the Canada Fund, the Western Pacific Fisheries Consultative Committee (WPFCC) and the United States Agency for International Development (USAID). The support services formerly provided by the International Centre for Ocean Development (ICOD), and currently by Canadian Ocean Resource Associates Inc. (CORA) are warmly appreciated.

COASTAL MANAGEMENT AND MARINE AFFAIRS EDUCATIONAL PROGRAMS

Niels West

Department of Marine Affairs
University of Rhode Island
Kingston, RI, U.S.A.

ABSTRACT

Academic programs offering graduate degrees in coastal management have increased significantly in the past five years from seven in 1987 (all in the United States) to more than two dozen in 1994. This development has been stimulated by a demand for coastal management professionals both in the U.S. and abroad which, in turn, raises a number of important questions related to both training of coastal managers and the future of this emerging profession. This paper describes the evolution of Marine Affairs/Coastal Management programs in North America and in Europe given the demand and supply considerations for professionals in this field. Considering the inability to fill the overseas demand for coastal managers (largely because of the high costs and lack of financial support) by the existing graduate programs, a number of short term coastal management training initiatives have been created in North America, Europe, and several overseas countries. The objectives of these initiatives differ from academic programs that aim to educate and conduct applied and basic research. The paper concludes with an analysis of the often divergent missions of training with those of the academic-based coastal programs. The primary missions of short-term training courses is to transfer existing coastal management principles and methods while university-based coastal educational programs formulate and test management hypotheses related to coastal management problems.

HISTORY

The development of academic programs leading to advanced degrees in marine affairs and coastal management has had a relatively short history, dating back to 1969. In little more than 25 years, approximately 24 academic programs have been developed worldwide. Given this impressive growth and the number of states that have or are adopting coastal management programs, and the dearth of professionals with capabilities to develop and implement such programs, it may be useful to review what has been accomplished and use this information as a baseline from which we might be able to project where we are going. Following the evolutionary review of marine affairs and coastal programs, the paper discusses the different educational tracks which have evolved in the United States and abroad with special emphasis on how Europeans have developed their professional coastal management capa-

bilities. The paper concludes with a series of observations and recommendations.

Two events have contributed to the development of marine affairs programs in the United States. One is the ongoing Law of the Sea conventions (UNCLOS) while the other is a series of coastal environmental committee reports that were published in the United States during the 1960s, culminating in the Stratton Commission in 1969. Before the Stratton Commission Report was issued, virtually all environmental legislation enacted in the U.S. had been created as sectoral legislation, defined here as legislation that addressed specific environmental problems. This is evidenced by the title of the acts which usually reflect the major reason or purpose of the legislation (e.g., clean air, clean water, solid waste, ocean dumping, wild and scenic rivers). As has been articulated elsewhere, these acts and the programs that were built around them more often

than not simply converted one environmental problem to another. While no one would argue that the Clean Water Act has resulted in cleaner rivers, lakes, and estuaries, some of these successes have had an adverse impact on other environments. The sludge left from secondary treatment became an ocean dumping problem until it was terminated a few years back by another sectoral law (Ocean Dumping Act). The prohibition of ocean dumping only exacerbated the problem by converting it to either an air pollution or landfill problem as alternate ways were considered to dispose of the sludge. The inefficiencies inherent in sectoral environmental management were finally recognized when the Coastal Zone Management Act (CZMA) was enacted in 1972, one of two environmental programs in the U.S. that called for a comprehensive management approach.

Until the passage of CZMA in 1972, nearly all environmental managers and policy makers were drawn from the sciences, planning, economics, geography, and political sciences. Each professional sought to interpret, develop, and implement solutions based on his/her own perception of how the problems ought to be solved in a normative sense. This sectoral approach to environmental problem solving has often resulted in suboptimal solutions and has neither benefited the environment nor the population for whom the plan was developed. Over time, it has been recognized that environmental problem solving can best be accomplished in an interdisciplinary setting involving the social, physical, and biochemical sciences and, most importantly, the constituencies for whom these programs have been developed. While this lesson seems rather obvious, considerable opposition has been voiced from traditional groups and government bureaucracies, many of whom are attuned to do "business as usual." To some extent, these problems are related to "turf" considerations, having less to do with how well an interdisciplinary approach might solve a problem.

I believe these developments, particularly those leading up to the enactment of the National Environmental Policy Act (1969) and CZMA, presented academic institutions with a problem as well as an opportunity. The problem, in part, is related to the difficulty many science graduates have in finding suitable employment within their field. In our own department, approximately 50 percent of our matriculating graduate students have undergraduate degrees in natural sciences. Many of those have been unsuccessful in finding employment in their respective disciplines.

The recognition that socio-environmental problems require an interdisciplinary approach presents universities with opportunities as well as dangers, particularly in those disciplines which have supplied the bulk of the environmental professionals. Furthermore, I believe these developments are likely to have an impact

on both graduate and undergraduate education in the U.S. and elsewhere.

The successful environmental manager of the future will have an interdisciplinary education rather than a highly specialized education as is now the norm. This is not to say there will not be a demand for well-educated scientists. I believe, rather, that opportunities here will increase in the future, recognizing that environmental problems will increase, not decrease. The implications of these developments are twofold. As indicated, I think traditional science departments will become more focused and academically challenging, offering exciting research and teaching opportunities for students and professionals whose primary interest is to teach and do research. The second development is the formation of a series of interdisciplinary departments with the primary focus of developing a management-policy-communication professional who is fully conversant with the most recent theories related to environmental management. Such a professional must be able to communicate with both the natural and social scientists, including policy makers, and have the skills to communicate with the general public. S(he) will have expertise in law, planning, environmental science, communication skills and several technical skills, such as GIS, and statistics. The primary purpose of this professional is to act as a link between the scientific community, the general public, and elected officials. That person's key responsibilities will be to develop plans that are viable from an ecosystems point of view and, to the maximum extent possible, should include the concerns and objectives of the population who will be living with the consequences of the environmental decision as well as having to pay for the projects economically, socially, and environmentally. I believe we are already beginning to see the creation of such academic departments both in the U.S. and abroad. The approximately two dozen marine affairs departments that offer advanced degrees in coastal management are the forerunners of other environmental management and policy departments that will address similar problems except that they will be land based.

PROGRAM MODELS

The organization of marine affairs programs in the U.S. has basically followed two paths. One relates to the academic home of the program and the other pertains to the structural organization of the program. About half of these initiatives have been developed within existing oceanographic colleges or schools and the balance within arts and science colleges. Structurally, most have been "floating programs," and are best described as a selection of courses drawn from a number of different departments. The involvement of the various departments is more a function of the faculty's interest in marine/coastal management and policy than the

department's orientation. The floating department often has no "roof" of its own, which means that both students and classes are spread throughout the campus. The permanent staff often consists of only one or two people who act as coordinators or program directors.

The other model consists of programs which have departmental, school, or college status and are characterized by a permanent faculty, perhaps complemented by adjunct faculty, drawn from within and beyond the institution. There are several advantages to this model. Such a program is better able to compete for scarce resources (staff, faculty, and budget) during fiscal crises which have characterized most public universities in recent years. I believe there are other advantages, as well, related to students' progress and academic welfare. If the program has a "roof" where both students and faculty tend to congregate and where most, if not all, the classes are taught, it means that both social, and, in particular, academic interaction are facilitated. Such interactions should improve the student's education as well as enhance the overall status of the program.

TABLE 1: CLASSIFICATION OF MARINE AFFAIRS/COASTAL MANAGEMENT ACADEMIC PROGRAMS

Academic Home	Structure	
	Floating	Program Status
Oceanography/ Science Based		
Social Science		

These two models can be illustrated graphically (see Table 1) where one axis exemplifies the academic home of the department and the other represents the structure of the program.

During the past several years, there has been growing interest in developing training courses in coastal management, fisheries, and related topics, raising the question of the relationship between training and education. Before briefly discussing this issue, I believe it is important to analyze the growth of training courses both in the U.S. and abroad. While the differences between the two concepts are not as clear as one would like, the primary purpose of training is to transfer existing information to the trainee in such a way that s(he) may undertake relatively routine activities upon completion of the training. This differs from education where the primary purpose is to collect, develop, and disseminate new knowledge and information. Ideally, the end product of an educational experience should be superior to that of a training experience if for no other reason than the emphasis—especially on the graduate level—is to identify resource management problems and then, based on the student's academic

experience, begin to develop a set of alternative solutions to the problem. What should be obvious, of course, is that before new knowledge can be generated, a lot of informational transfer (i.e., training) will have to be accomplished. Nonetheless, the key function of a university program (whether graduate or postgraduate) is to uncover new knowledge pertinent to the field which, in this case, is coastal management.

NORTH AMERICAN VERSUS EUROPEAN APPROACHES TO COASTAL MANAGEMENT

There are fairly significant differences between the traditional North American model of environmental education and that which has evolved in Europe¹. By way of general background, the European tradition has a much longer history and is based more on self-study compared to the U.S. model which from a temporal perspective is more rigorous, especially at the undergraduate and master's levels. The number of required courses in an American university has generally been higher compared to the European counterpart. The latter is responsible for showing evidence of overall comprehension of the material; how it is accomplished is the student's responsibility. Historically, this has led to a longer university education for most European students with total costs (direct and indirect) that tend to be considerably higher. However, in most European countries, the financial obligation rests with the national government as opposed to the American student who is personally responsible for a much higher proportion of the cost of education.

Another fundamental difference is the emphasis placed on the transfer versus the development of information. In general, the European undergraduate student is better prepared in basic studies (language, mathematics, writing, and communication) compared to his North American counterpart. The emphasis in the U.S. and Canada, especially on the master's and doctorate levels, is on problem identification and problem solving. From an environmental point of view, these differences may be related to the different ways in which environmental management has been formulated and implemented. For many years in Europe, there has been an emphasis on comprehensive planning, sometimes referred to as physical planning. In part, this development is a result of overall higher population densities and the need to allocate and manage environmental resources from a social equity perspective. In North America, especially in the U.S., personal property rights have had a much stronger tradition resulting in a de-emphasis of that regional and national planning model. It is suggested that the differences in national planning goals have had funda-

¹ These comments apply, in particular, to the traditional academic programs (history, biology, mathematics, etc.).

mental impacts on both educational systems. The European planning and resource management student views problems from a comprehensive planning perspective, whereas the North American emphasis has been to concentrate on identifying a problem followed by the development of a series of possible solutions. Comprehensive planning requires a nationwide commitment of both human and economic resources. For a variety of reasons, this has not been considered viable in either the U.S. or Canada.

A third philosophical difference between the two systems, which may become less significant with a fully integrated EU, is the hiring policy which prevails within European universities. Most universities in North America have instituted policies which effectively prevent them from hiring within their own institution. The result has been more cross-fertilization of ideas between and among faculty and students. The same pattern has evolved, although to a lesser extent, when students choose what university to attend for their higher education. A much higher proportion of North American students seek different educational programs at all levels of the educational hierarchy. Consequently, most graduate students will study at different universities from where they received their previous degrees. This pattern tends to foster diversity and, generally, results in more and better ideas.

The different paths which the two continents have taken have had fairly important implications for overseas coastal aid efforts. Given that many of the host nations are former colonies of European powers, one would assume that European-initiated aid would have been a comprehensive effort that stressed overall planning. However, many European coastal aid efforts have stressed technical solutions as opposed to comprehensive regional approaches to physical planning. Examples include engineering projects such as harbor developments and beach stabilization projects.

On the other hand, the U.S. coastal aid efforts have been quite different, emphasizing soft approaches compared to European efforts. Most have been in the form of demonstration projects intended to serve as examples of what can be done with the expectation that such demonstration projects would be copied elsewhere.

The suggestion here is that the European educational model, and the way aid money has been spent, has been less successful in solving coastal problems in a host country. Part of the reason may be the lack of a countrywide comprehensive planning system in most of the countries that have received donor aid. In that context, the U.S.-oriented model, emphasizing problem identification and problem solving, may be more appropriate in host countries where the physical and social infrastructure is not as developed as it is in Europe.

There is little doubt that what has driven the aca-

demic programs in the U.S. has been the ability to place graduates in positions where they can use their new professional skills. Historically, most of the graduates from U.S. marine affairs (coastal) institutions find employment with the federal government. As the federal role in coastal management has become decentralized, placing more of the implementation burden on the coastal states, recent job opportunities have been found primarily on the state and local levels. One potential growth area is the private sector which, during the past quarter century, has had to operate within a complex coastal regulatory system. Another potential growth area is the NGO community, many of which are becoming increasingly involved in developing, implementing, and managing overseas projects. These developments are also part of the federal government's efforts to decentralize as many of the activities that were controlled exclusively from Washington. I believe these developments have resulted in the creation of a new marine affairs concentration which, to some extent, transcends the traditional areas which have characterized marine affairs degree programs. For lack of a better term, we may call this new concentration international marine management. Most European countries do not make a distinction between coastal management, fisheries, pollution abatement, or ports and shipping. Since all are operating within the coastal zone, however it is being defined, most host countries have tried to address problems within the broader rubric of coastal management.

Should this subject concentration materialize, it will bring a new dimension to what has been identified for 25 years as marine affairs and undoubtedly will impact the way in which marine affairs is being taught in the United States and perhaps elsewhere as well.

CONCLUDING REMARKS

A lively discussion has begun during the past couple of years concerning the discipline of coastal management. This discussion has centered on two related topics: the relationship between training and formal education and the relationship between applied coastal management and coastal management as a full-fledged discipline. It is clear that these issues have not yet been satisfactorily clarified. Most of the research which has been carried out within the broad rubric of coastal management has been case studies and reports. While such studies are vitally important to professionals charged with solving practical coastal problems, the findings are generally limited to a specific site and cannot easily be transferred to other locations without serious risk of failure².

² An excellent example of this problem is illustrated by the biennial Proceedings of the Coastal Zone Conferences that, in recent years, has approached and sometimes exceeded 5,000 pages, nearly all of which are in the form of case studies.

The reason for this is that academic coastal professionals have been unable to formulate and test hypotheses related to coastal issues. This failure is due, in part, because the number of academic professionals is small, perhaps no more than a few dozen worldwide. For coastal management to develop from a strictly applied activity to a recognized academic discipline, the approach to problem solving will have to change from one of solving questions related to a specific site to one where the problem(s) will be formulated as a hypothesis (theory) which is then tested, accepted (rejected), or restated. In short, a body of hypotheses and theories will have to be developed that is unique to coastal management. To the extent that coastal managers utilize the scientific approach, the hypotheses and theories are borrowed from allied fields. Examples include political science, geography, economics, ecology, etc. While this is neither wrong nor inappropriate, the solutions will invariably reflect the discipline from which methods, models, and hypotheses have been invoked.

If coastal management is to make the transition from subfields of established disciplines to a discipline in its own right with a well-tested research approach, hypotheses, and theories, this evolution is absolutely essential. Furthermore, the successful creation of such a "philosophy" comprising methods, hypotheses, and eventually theories unique to coastal management will obviate the need for reinventing the wheel every time a coastal professional is confronted with a management problem which has already been solved sometimes in a number of different locations. For this to evolve, the academic profession must redirect its own research emphasis from conventional case studies to basic research, the primary purpose being to formulate and test coastal hypotheses, develop common research approaches and, as far as possible, create a data collection system which can be replicated over a range of different locations. The research which will result from such efforts is absolutely essential if we are to move away from the "finger-in-the-dike" approach to coastal management which has characterized this profession.

The search for common themes will no doubt be fraught with failure. However, negative findings are important contributions to the growing body of coastal management literature as are the research hypotheses which have been accepted as truth. This evolutionary step is identical for every other research activity that started as an interesting research activity and evolved into a full-fledged discipline. The evolution of ecology involving biologists, hydrologists, soil scientists, and biogeographers is but one recent example. Finally, the successful development of a coastal management discipline will result in some direct benefits to coastal practitioners. They will be able to apply field-tested models and concepts to a large class of problems that share approximately the same social and physical characteristics.

MEDCOAST INSTITUTE: A TRAINING PROGRAM ON COASTAL ZONE MANAGEMENT IN THE MEDITERRANEAN AND THE BLACK SEA

Erdal Özhan and E. B. Çulhaoglu

Medcoast Permanent Secretariat
Middle East Technical University
Ankara, Turkey

ABSTRACT

There is a great need for expertise on integrated coastal zone management in many Mediterranean and Black Sea countries. An international certificate program has been started with the financial support of the Med-Campus Program of the European Community and institutions collaborating in the Network MEDCOAST. This annual program gives "hands-on" training to participants who are selected based on their background and job positions.

BACKGROUND

The MEDCOAST Initiative began with the First International Conference on the Mediterranean Coastal Environment, MEDCOAST 93 which was held in Antalya, Turkey on November 1-5, 1993. The initiative was launched with the intention of contributing to the environmental management of the Mediterranean and the Black Sea with research, human resource development, and by exchanging information and know-how.

MEDCOAST Institute 94, the international training program on the theme of Coastal Zone Management in the Mediterranean and the Black Sea, was organized within the framework of the MEDCOAST Initiative, with support and contributions of the Network MEDCOAST member institutions, and the generous financial support of the European Community through their Med-Campus program. The historical background of the MEDCOAST Initiative, together with various training, research, and information exchange activities which have been carried out, will be described in this paper.

OBJECTIVES

The four major objectives of the MEDCOAST Institutes are:

- To train professionals from the riparian countries on relevant environmental management issues concerning the coastal and sea areas of the Mediterranean and the Black Sea with in-class training, observations, and applied research

- To serve as a vehicle and a forum for exchange of information and experience among professionals of the Mediterranean and the Black Sea and experts from other coastal countries, for successful coastal zone management practices relevant to the Mediterranean and the Black Sea by relying on scientific information and modern management tools
- To contribute to the international efforts, such as the Mediterranean Action Plan, the Global Environmental Facility (GEF) Black Sea Environmental Programme, and the Black Sea Action Plan, by introducing these activities to the participants and by contributing to the development of human resource capacities in the riparian countries where they are very much needed for the execution of these international programs
- To carry out applied research on various aspects of coastal and sea management in the Mediterranean and Black Sea and contribute to public awareness

PARTICIPANTS

The highest priority target group for the MEDCOAST Institute 94 participants were professionals holding mid-management positions in their central governments who are responsible for the planning and execution of programs or projects on coastal and sea issues. The other groups, in decreasing order of priority, were employees of coastal municipalities, nongovernmental

environmental organizations, and universities and research centers. The participants were required to have a university degree (bachelor of science, engineering, art, or law) in a relevant field, and at least five years of work experience.

25 participants from 16 Mediterranean and Black Sea countries (see Annex 1) took part in the activities of the Institute. The participants' ages ranged from 22 years old to 52 years old. Some details regarding participants' backgrounds, degrees, and positions are provided in Annex 2.

FACULTY AND CONTRIBUTORS

The Institute was developed through the leadership of Middle East Technical University (METU) in collaboration with seven institutions (four universities, one research, and two non-governmental professional organizations) participating in the Network MEDCOAST in 1994. Scientists and professionals from these seven institutions contributed to the curriculum of the Institute. In addition, experts from the Mediterranean Action Plan (MAP) and the GEF Black Sea Environmental Programme were invited as guest lecturers to discuss these important international efforts to the participants. The list of faculty members of the MEDCOAST Institute 94 is given in Annex 3.

CURRICULUM

The program of the MEDCOAST Institute 94 consisted of three parts:

- A two-week training in the classroom on various topics related to integrated coastal management (ICM) in the Mediterranean and the Black Sea. The class, which included formal lectures given by the faculty on various topics related to ICM, incorporated the use of audiovisual equipment and group exercises (METU Campus, August 22 - September 2, 1994).
- An eight-day field trip on three traditional wooden boats that sailed along the coast of Bodrum Peninsula and in Gökova Bay, anchoring at places where significant coastal conservation had taken place or where participants could observe development activities, applied research, or have an opportunity to conduct interviews (September 3-11, 1994).
- A two-day concluding workshop included a half-day simulation game of an ICM scenario, presentations by the participants, and group work (METU Campus, September 13-14, 1994).

IN-CLASS TRAINING

During the first two weeks of the Institute, lectures were delivered by the faculty on various aspects of ICM in the Mediterranean and the Black Sea. The topics covered are listed in Annex 4. Participants were provided a set of course materials that included lecture

notes, earlier papers and reports, and references. The participants and faculty members discussed the lecture following the faculty member presentation. Slides and transparencies were used in all lectures. PC demonstrations and video were also used in some lectures. In addition to the lectures given by the faculty, four group work sessions were carried out. During these sessions, various ICM issues were debated. These four group work sessions are briefly described:

PRESENTATIONS BY PARTICIPANTS ON ICM ISSUES IN THEIR COUNTRIES

When participants were accepted to the Institute, they were asked to prepare a short presentation on ICM issues in their countries. The presentations provided general information about the country and described important ICM issues (e.g., population, area, length of coasts, important coastal uses and problems, existing legislation on coasts, institutional structure). Both faculty and participants found the presentations very interesting and instructive.

IMPORTANT COASTAL USES AND PROBLEMS OF EACH COUNTRY

For their own countries, the participants were asked to list—independently—six coastal uses and ICM problems in decreasing order of importance. The responses were gathered and evaluated collectively. Urbanization and energy were ranked as the primary coastal uses by the majority of participants. Tourism, transportation, ports, and fisheries emerged as the second category of most important coastal uses.

According to the participants, the list of important ICM issues in the Mediterranean and Black Sea countries included insufficient infrastructure, hazards to the underwater world, landscaping or destruction to nature, declining biodiversity, coastal erosion, air pollution, water pollution, lack of technical staff, lack of laws, rapid development, market economy, transportation/industrial hazards, and lack of planning. The majority said that water pollution was the most important issue while erosion, air pollution, lack of laws, transportation, and destruction to nature also were ranked high in importance.

PRIMARY COASTAL USES AND PROBLEMS ON A REGIONAL SCALE

This exercise had a similar objective as the one above, but the perspective was broadened to include regional seas. The participants were grouped as belonging to three geographical regions: the Black Sea, the eastern Mediterranean, and the western Mediterranean. Collectively, the participants debated collectively as to the important uses of the seas and the ICM issues that exist in their regions, and negotiated to list six uses and issues in decreasing order of importance. Tourism

emerged as the primary coastal use in all three regions. The Black Sea and the eastern Mediterranean groups ranked industry as the second most important, whereas the western Mediterranean group chose urban settlements. Ports and harbors, facilities, and transportation were the third most important use for western Mediterranean and Black Sea, whereas it was urbanization for the eastern Mediterranean.

The primary coastal problem noted by all groups was pollution. The second was erosion for the western Mediterranean, lack of legal arrangements for the eastern Mediterranean, and destruction of coastal habitats for the Black Sea.

COASTAL USES MATRIX

The participants were given a comprehensive coastal-use matrix and asked to fill out the relationship among various uses as conflicting, complementing, or mutually exclusive, relying on experiences from their own countries.

FIELD OBSERVATIONS AND INVESTIGATIONS

The field study portion of the Institute provided a highly valuable experience for both participants and faculty. Faculty and participants traveled on three traditional wooden boats along the coast of Bodrum Peninsula. The peninsula is the site of a pilot ICM study while the coast of Gökova Bay is a specially protected area.

During the boat trip, significant coastal habitats, conservation areas, and important coastal developments were observed. Institute participants conducted interviews with developers, local NGO representatives, protected area managers, and central government officials.

Participants, in pairs, were assigned topics for detailed observation and investigation during the field trip and required to present their reports later during the concluding workshop. The topics included harbors and marinas, the controversial airport construction next to Güllük Wetland, beaches around the peninsula, coastal uses and issues, tourism development, fisheries, coastal impacts, urbanization, specially protected areas, environmentally sensitive areas, roles of NGOs and local governments, and appraisal of development with respect to Turkish shore law. Important aspects of the field trip were recorded with a video camera to use as a documentary film for public awareness and education on ICM issues.

CONCLUDING WORKSHOP

On returning to Ankara, after a one-day break, the concluding workshop was held. In the first part of the workshop, participants made presentations with the information they had gathered through observations and investigations during the field trip on their assigned topics. Each presentation was followed by an open discussion. Some of the presentations were excellent. This

activity was very educational and valuable for the faculty and participants.

The scenario of the simulation game, which continued for a full morning, was kindly provided by the International Academy of the Environment-Geneva. The multi-party simulation was based on Ibis Bay, an estuary located between two municipalities, Meditayla and Aegeana. Eight participants acted out the different characters who were involved in the "dispute." The scenario was based on a dispute among two municipalities. The problems included use of the coastal zone, water pollution and a required sewage treatment plant, and financing the treatment plant by involving the central government offices and international donor agencies.

The concluding workshop consisted of two parts. The highlight of the field trip was a trip to Sedir Island. This remarkable island, roughly 600 meters long and 400 meters wide, is located a few hundred meters offshore in the Gökova Bay. The island is famous for its natural beauty, a variety of archaeological remains, and the only ooid beach (Cleopatra Beach) along the Turkish coast. The group discussed and made conclusions about the important resources of Sedir Island, how they are utilized, and the associated problems. The group debated various aspects of a proper management plan and important management rules were eventually decided by voting. This exercise was very enjoyable and instructive.

In the final hour of the workshop, 300 slides were shown sequentially from the field trip, depicting the important highlights of the field trip and enjoyable scenes of boat life! During the farewell party held that evening, participants were awarded the Med-Campus Certificate on Coastal Zone Management in the Mediterranean and the Black Sea.

EVALUATION

Participants were asked to evaluate the MEDCOAST Institute 94 activities at two stages; first, after the in-class training, and second, at the conclusion of the workshop. The participants were asked to comment on the in-class training, including their views on the choice of curriculum subjects, group work, lectures, and faculty and to make suggestions for improvements. All participants were asked to complete a questionnaire concerning all three parts of the Institute. The questions covered many academic matters in addition to the overall evaluation. Many important suggestions were received. Some of these will be implemented in the MEDCOAST Institute 95. With the conclusion of the Institute, faculty members wrote evaluation reports and made valuable suggestions for the next event.

The overall opinion of the participants and faculty was that MEDCOAST Institute 94 was highly successful as a starting event. The three stages of the Institute were considered to be appropriate and useful. It was

the general belief that the Institute provided an opportunity for high-quality training for qualified professionals from the Mediterranean and the Black Sea riparian countries.

CONCLUDING REMARKS

- MEDCOAST Institute 94 was a successful beginning for a balanced, high-quality training course on ICM in the Mediterranean and the Black Sea, designed for professionals of the riparian countries who will be involved in national or international ICM programs.
- The MEDCOAST Institute 95 is scheduled to take place from August 28 to September 15, 1995, in Ankara and Marmaris. The Institute will be slightly modified in light of the experience gained during the 1994 Institute with the suggestions of participants and the faculty. The 1995 Institute will be shortened to three weeks and the role of the participants (presentations, discussions, group work) will be upgraded. In addition to oral presentations, a poster session will be organized with contributions from the participants. Theoretical lecture information will be replaced, to some degree, by real case studies typical of the Mediterranean and the Black Sea. Professional interaction between the faculty and the participants will be increased.
- For 1995, the Network MEDCOAST has increased to 10 members including the Polytechnical University of Catalonia (Spain), the University of Malta, and Technion (Israel). It is expected that a greater number of faculty will contribute to the 1995 Institute.
- The MEDCOAST Institute 1994 was sponsored basically by the Med-Campus Program of the European Communities and the Middle East Technical University. It has been agreed that the Global Environmental Facility (GEF) Black Sea Environmental Programme Coordinating Unit will be a cosponsor for professionals from the Black Sea riparian countries at the 1995 Institute.
- A highly condensed version of the 1995 Institute will be offered as a two-day long short course (October 23) prior to the Second International Conference on the Mediterranean Coastal Environment, MEDCOAST 95, to be held in Barcelona, Spain, October 24-27, 1995.

REFERENCE

- Özhan, E. (1995), "MEDCOAST Initiative: Contributing to the Environmental Management Coastal and Sea Areas of the Mediterranean and the Black Sea", In *Proceedings of the Workshop on Educating Coastal Managers, 5-10 July 1995*. Narragansett: Coastal Resources Center, The University of Rhode Island.

ANNEX 1: COUNTRIES REPRESENTED BY PARTICIPANTS IN MEDCOAST INSTITUTE 94

Bulgaria	2	Croatia	1	Egypt	1
Georgia	1	Israel	1	Italy	1
Jordan	1	Libya	1	Morocco	1
Rumania	1	Russia	1	Slovenia	1
Spain	1	Tunisia	1	Turkey	9
Ukraine	1				

ANNEX 2: INFORMATION ON THE BACKGROUNDS, DEGREES, AND POSITIONS OF THE PARTICIPANTS

Backgrounds:	Engineering	11
	Natural Sciences	9
	Social Sciences	5
Degrees:	B. Eng., B.S., or B.A.	11
	M.Eng., M.S., or M.A.	7
	Ph.D.	7
Positions:	Government Agency	13
	NGO	1
	University/Research Org.	10
	Private Sector	1

The Positions of the MEDCOAST Institute 94 Participants

- Expert in the Ministry of Environment
- Senior Scientist, Project Manager
- President of an NGO
- Chief Specialist, Ministry of Science and Technology Policy of the Russian Federation
- New graduate
- University instructor (2)
- Researcher (6)
- Regional Planner in the Ministry of Environment
- Government Consultant
- Government Adviser
- City Planner
- Director of Department

ANNEX 3: FACULTY MEMBERS WHO CONTRIBUTED TO THE MEDCOAST INSTITUTE '94

Prof. Ayfen Ergin, Middle East Technical University, Ankara, Turkey
 Dr. Frank van der Meulen, University of Amsterdam, The Netherlands
 Prof. Erdal Özhan (Head), Middle East Technical University, Ankara, Turkey
 Dr. Jens Sorensen, University of Massachusetts, Boston, U.S.A.
 Prof. Adalberto Vallega, University of Genoa and ICCOPS, Italy
 Mr. Jentje van der Weide-Delft Hydraulics, De Voorst, The Netherlands
 Prof. Allan T. Williams-University of Glamorgan, Pontypridd, Wales, U.K.
 Dr. Ljubomir Jeftic, Deputy Coordinator, UNEP-MAP (guest lecturer), Athens, Greece

ANNEX 4: COMPLETE PROGRAM OF THE MEDCOAST INSTITUTE 94

<i>August 21, 1994, Sunday Arrival</i> Ankara	Coastal and marine systems: Rocky coastal management (Williams)	Afternoon Free
<i>August 22, 1994, Monday Opening session</i> Welcome addresses and general introduction to the MEDCOAST Institute 94 (Özhan) Concept and history of ICM and sustainable development (Sorensen) Mediterranean Action Plan (MAP) of UNEP (Jeftic) Coastal Zone Management (CZM) in the MAP (Jeftic) Orientation of the participants (Staff)	Coastal and marine systems: Sandy coasts and dunes (two lectures) (vd Meulen and vd Weide) Coastal and marine systems: Mud coasts and wetlands (Williams)	<i>September 1, 1994, Thursday</i> Natural processes and economic contexts in the Mediterranean area (two lectures) (Vallega) The role of legal and jurisdictional Mediterranean frameworks (two lectures) (Vallega) Participants' presentations on national CZM issues and practices (Group work) (All staff)
<i>August 23, 1994, Tuesday</i> ICM, Common methodology using systems analysis Part A: Basic concepts of the system approach (vd Weide) ICM, Common methodology using systems analysis Part B: A general system analogy for the coast (vd Weide) Coastal resources (Sorensen) Coastal uses (Sorensen) The natural coastal system in a global perspective (vd Weide) Hydrodynamic processes I (Waves and wave induced currents) (Ergin)	<i>August 26, 1994, Friday</i> Engineering Technology (two lectures) (Ergin) Coastal development and environmental impacts (two lectures) (Özhan) Coastal uses and problems at national and regional levels (group work) (Özhan and Williams)	<i>September 2, 1994, Friday</i> Coastal use structure (two lectures) (Vallega) Coastal use interactions (Group work) (Vallega) Core issues and possible options (Vallega) Bodrum Peninsula: Introduction to field studies (Özhan) Bodrum Peninsula: Introduction to field studies (Özhan & Kiraç) Training class evaluation by participants Evening Travel to Bodrum
<i>August 24, 1994, Wednesday</i> Hydrodynamic processes II (Waves and wave induced currents) (Ergin) The coastal and marine systems: Basic ecological concepts and systems (two lectures) (vd Meulen) Sightseeing around Ankara	<i>August 27-28, 1994, Saturday and Sunday</i> Trip to Cappadocia (sightseeing)	<i>September 3-11, 1994</i> Field studies along the Bodrum Peninsula and the Gökova Bay
<i>August 25, 1994, Thursday</i> Transport phenomena and coastal water quality (Özhan) Coastal water quality management (Özhan)	<i>August 29, 1994, Monday</i> Use of models and decision support systems in CZM (vd Weide, vd Meulen and Özhan) ICM techniques and instruments (two lectures) (Sorensen) Environmental economics (Sorensen) Participants' presentations on national ICM issues and practices (group work) (All staff)	<i>September 13, 1994</i> Concluding Workshop at METU Participants' presentations of field study reports
	<i>August 30, 1994, Tuesday</i> Beach management (Williams) Coastal tourism (Özhan) Marinas (Özhan) Specially protected areas I (Özhan) Specially protected areas II (Williams) Sea level rise and challenges for CZM (Williams)	<i>September 14, 1994</i> Concluding Workshop at METU Simulation game on Ibis Bay Management plan of Sedir Island (Group work) Slide show on the field trip. Course evaluation questionnaire.
	<i>August 31, 1994, Wednesday</i> Governance and institutional arrangements (two lectures) (Sorensen) The structure of Agenda 21 for the Mediterranean (two lectures) (Vallega)	<i>September 14, 1994</i> Banquet and graduation ceremony <i>September 15, 1994</i> Departures

COASTAL MANAGEMENT TRAINING AND DEGREE PROGRAMS: STATUS AND TRENDS

PANELISTS: R. South, L.M. Chou, N. West, J.L. Ferman

MODERATOR: E. Ferrer

RAPPORTEUR: Brian Crawford

DISCUSSION QUESTIONS

Content:

- How well do programs address needed skills and knowledge?
- To what extent should demand drive the content of curricula?
- What are the priorities for course/curriculum/program development?

Educational Approaches:

- What should the balance be between academic courses and practicums-internships-theses?
- What are the merits of graduate, professional, and undergraduate degree programs?
- What are the advantages and disadvantages of various educational methods/approaches (adult educational methods, on-the-job training, internships, exchanges, and distance learning)?
- How do training and educational programs differ (content, methods, clients, participants), and what is the balance between the two?

RAPPORTEUR'S REPORT

There is a wide diversity of university program models, both in the type of institutional arrangements and in the content of the programs. Many Integrated Coastal Management (ICM) educational programs have been grafted onto existing disciplinary programs and, therefore, reflect the bias of the originating department in terms of content emphasis. Some, such as the program at the University of Technology Sydney, and the University of the South Pacific, have been driven by a careful assessment of needs.

It was the general consensus that a diversity of programs is probably required to meet the varied demands. Programs are, in part, a function of existing in-

stitutional arrangements and opportunities. Some programs have started as a specialization in a disciplinary program and have evolved into a separate ICM program over time. Since needs are driven by the local context and institutional setting, it is difficult to determine a "core" curriculum that may apply universally. A better approach may be to look at a "framework" curriculum from which a core curriculum can be selected and adapted to any given place. There is a need for a balance between a technical orientation and a policy and management orientation. Determining that balance is difficult and may depend on institutional constraints and opportunities.

The group agreed that curricula must target different types of individuals. Two basic groups were identified. The first are those who are in traditional disciplinary or sectoral programs such as fisheries, marine science, engineering, or forestry. While this group will always identify themselves with their core discipline, they need to broaden their understanding to participate effectively as members of interdisciplinary teams which contribute specialized expertise to coastal management initiatives. The second group are those who identify themselves more as coastal managers. These individuals are general practitioners—and they need a broad perspective and an ability to integrate information from many disciplines. It was also recognized that some nations, where local officials attain less than a college-level education, will require ICM curriculum targeted at the undergraduate and high school level. Programs need to be designed that carefully consider the starting point of their clientele.

Regardless of the targeted group, it was felt that coastal management practitioners need to be involved in the educational process, either by teaching a few lectures or courses, or by providing internships and practical experience to students. The use of practitioners can also help compensate for the fact that many university programs have small numbers of faculty capable of teaching ICM.

There is a need to tailor learning to the meaning of management and, therefore, to the core of the coastal management profession. It is recognized that coastal management is people oriented and requires changing human behavior. In addition, the profession needs to identify the tools, methods, and principles that can be applied regardless of location or local context. This has not been well identified nor has consensus been achieved in the past.

There was much discussion about demand. Everyone felt the needs are great but difficult to quantify on a broad scale. It was also felt that because ICM is a new and emerging field, local institutions may not be able to express their needs directly or be aware of their needs. In such circumstances, universities may want to develop training and degree programs which take a proactive approach to spurring demand and catalyzing coastal management through the pioneering efforts of their graduates and through faculty research and public service. Needs can be diagnosed by looking at current governance practices and the conditions and trends of the coastal resources and environment.

One educational strategy may be to inject coastal management courses into existing programs that are offered for technical specialists. This will provide a common framework of terminology and concepts and foster communication and integration with specialists from other disciplines. The second strategy is to develop programs for individuals who identify themselves as a coastal manager. For these individuals, their position title may not be coastal manager even though they perform this role. These are the supervisory level individuals who manage interdisciplinary teams and who have decision-making powers. They are more generalist in nature and play the role of integrator.

There was much discussion about the need for a coherent method and an approach for the coastal management profession (as established in other professions) that crosses regional, national, political, social, and economic boundaries. However, educational programs must then be tailored to the needs of any given place.

It was clearly recognized that coastal management is an interdisciplinary field that, ideally, requires a diverse and broad range of knowledge and skills. There is a need to prepare the next generation of managers better since the current generation is failing as evidenced in the decline of coastal quality in many places around the world. This is also an indicator that educational programs are not fully meeting needs.

Since the types of people involved in coastal management are diverse, this raises the challenge of providing a core curriculum. On-the-job training and internships need to be given more consideration as an educational and training strategy, particularly for existing managers. There is certainly a need for individuals

with good communication skills and the ability to integrate science and policy, particularly as evidenced in the United States coastal management experience. However, a flexible curriculum which can be tailored to the specific needs of individuals must take into account entry level abilities which can vary considerably. A tailor-made curriculum can be selected from the framework curriculum to meet needs for individuals and for any given place.

The group felt that there was a common need for an emphasis in the curriculum on the principles, paradigm, philosophy, and ethics in coastal management. This includes the ability to measure outputs of whether coastal management efforts are successful. Two general categories of indicators are needed: determining the quality of the environment (is the condition improving) and assessing the capability of governance systems and whether coastal communities are better off. It was agreed that there is a need for a set of fundamental tools and concepts as well as an understanding of past experience in coastal management as part of the curriculum framework. Tools include skills in:

- Resource assessment
- Planning and research evaluation
- Resource economics
- Geographic Information Systems (GIS)
- Communication and group facilitation
- Legal, institutional, policy, and governance analysis
- Social preparation skills (e.g., community organizing, conflict resolution)

Additional skills and attitudes include:

- An ability to integrate a diverse array of technical information and issues (including socioeconomic, political, and cultural issues)
- A common philosophy of ICM which includes the concept of participation.

SECTION 3

EXPERIENCE IN CAPACITY BUILDING: CASE STUDIES AND LESSONS LEARNED

Development of the Coastal Resources Institute (CORIN) <i>Somsak Boromthanasarat</i>	93
Coastal Resource Management: Education and Capacity Building in Government, Community, and the University <i>Kenneth R. Brown</i>	97
Building Capacity for Coastal Management at Universities <i>J. Stanley Cobb</i>	102
Capacity Building: A Case Study of the Marine Science Institute, University of the Philippines <i>Edgardo Gomez</i>	110
Rapporteur's Reports Experience in Capacity Building: Case Studies and Lessons Learned	115

DEVELOPMENT OF THE COASTAL RESOURCES INSTITUTE (CORIN)

Somsak Boromthanarat

Coastal Resources Institute
Prince of Songkla University
Hat Yai, Thailand

ABSTRACT

Thailand has 2,600km of coastline. Southern Thailand's economy has been traditionally linked with its coastal resources. With growing pressure from different user groups for coastal resources, such as mangroves, it is inevitable that management plans must be put in place to avoid social problems and to sustain important natural resources. To address these issues, the Coastal Resources Institute (CORIN) was created at Prince of Songkla University with the intent to develop long-range plans for local and national governments and other countries in the Asia-Pacific region.

INTRODUCTION

Thailand has 2,600km of coastline bordering the Gulf of Thailand to the east and the Andaman Sea to the west. More than 70 percent of the Thailand's coastline is located on its southern isthmus. Southern Thailand's economy has traditionally been linked to coastal resources.

The coastal resources in Thailand are increasingly subject to conflicts of interest between different resource users. An example is the management of mangroves in the Pak Phanang River and Bay area in southern Thailand. Although the Thai government has officially given mangroves a protected status to conserve valuable genetic resources and to enhance coastal protection, mangrove forests continue to be displaced because of shrimp culture and tree harvesting. Fishermen, on the other hand, see mangroves as productive fish habitats and want mangroves preserved.

In such a situation, it becomes inevitable that these areas have to be managed in order to avoid social problems or to avoid the destruction of natural resources. To be able to design a functional management strategy, it is essential that each issue is properly analyzed and that the impacts of different management strategies are assessed.

CORIN STRATEGY

It is because of these needs that the Coastal Resources Institute (CORIN) at Prince of Songkla University (PSU) in southern Thailand came into being. The idea for CORIN grew from a cooperative effort between the governments of Thailand and the United States to strengthen Thailand's policies institutional capabilities in coastal management. CORIN was established in 1989 as a result of an agreement between the University of Rhode Island and PSU.

CORIN is an interdisciplinary center of excellence in integrated coastal management within the university. Its aim is to service local and national governments in Thailand and other countries in the Asia-Pacific region.

To meet its goals, CORIN has developed a long range plan for growth that will strengthen its capacity for Integrated Coastal Management (ICM). The growth and strengthening will be accomplished with the following activities:

- Providing opportunities for future education or training of CORIN staff and associates
- Developing training courses for coastal resource managers
- Practicing ICM through research, planning, and policy formulation

An ICM plan requires the capabilities to analyze three main components:

- The natural environment
- The socioeconomic system
- The management arrangements

Special attention is paid to the relationship between the functions that are provided by the natural environment and the values that are given to these functions by society. We concentrate on the construction of a so-called function/value matrix. Such a matrix is a first and necessary step in the formulation of coastal resources management strategies.

Environmental functions can be translated into services and goods for society. A distinction is made between regulation functions (such as coastal protection or maintenance of biological diversity), carrier functions that provide facilities for human activities (such as a suitable substrate for agriculture, aquaculture, or housing), production functions (fish, trees, minerals, water), and information functions (scenery, preservation areas for scientific research, religious or cultural perception of nature).

By using these goods and services, the socioeconomic system puts a value on functions. Different values can be identified:

- Social values refer to the quality of life in its broadest sense (health and safety, housing conditions, religious and cultural values).
- Economic values, both as direct consumption or as input in other economic activities, are usually expressed in monetary units (cost/benefit of economic sectors such as fishery or aquaculture; household income as an indicator of the effects of economic activities; or gross domestic product as a national indicator).
- Ecological values include cross-boundary influences on other regions or ecosystems, and intergenerational aspects that refer to the importance of the environmental functions for future generations (usually translated as sustainability).

The CORIN approach can help to clarify the value of coastal resources for society and may lead to a more accurate weighting of coastal resources in the decision-making process. However, a variety of tasks are required to obtain the relevant data for ICZM framework analysis. The tasks are accomplished by using a set of “tools” for management. They include:

- Participatory rural assessment results in an historical profile of the ecological and social changes of the area and the identification of issues and conflicts placed in an historical context

- Governance analysis identifies the context of laws, customs organizations, and management strategies established by society to allocate scarce resources and competing values for a social purpose, such as managing a nation’s coastal resources
- Geographical organization of data (via the technology of Geographical Information Systems) that allows the computerized storage and analysis of geographical databases such as the distribution of soils, land use, and wetlands. This is also a planning tool since the preparation and analysis of various land-use options can be performed
- Workshops, interviews and “town meetings” that involve and inform local citizens and government officials in the development of management policies and plans.
- Public awareness and environmental education is used to develop the understanding of coastal resource issues and solutions and to promote citizen involvement in the decision-making process and, ultimately, to promote acceptance of policies and plans.

The advantage of CORIN’s approach is that we are building problem-solving skills while working with the public and private sectors to address issues that are important for them. Moreover, we transfer our knowledge and experience to those with whom we are working, making our projects successful with longlasting effects. The benefits of our approach include:

- Use of practical hands-on experience (learning by doing)
- Building and strengthening local capabilities to provide necessary technologies and skills
- Local populations become aware of the relationships between their environment and their economic situation
- The development of resource management supports local and short-term goals, and global and long-term goals
- Regional networks are developed

CORIN has developed an international training course in Integrated Coastal Management (ICM) for Thai and foreign trainees that has been well attended by scientists, teachers, managers, government officials, policy makers, and members of the private sector with educational background ranging from a B.Sc. to a Ph.D. from 15 different countries in Southern and Southeast Asia, Africa, and the South Pacific region. The three-week training course has attracted 25 to 30 participants annually. The course aims to familiarize participants with the concepts and tools of ICZM through research,

lectures, group work, and case studies in coastal zone areas. The course emphasis is on planning and integration, rather than technical details.

The first course in 1992 was in cooperation with the University of Rhode Island. In 1993, CORIN presented the course by itself based on the 1992 experience. In 1994, the course gave more attention to quantitative approaches, concepts, and tools.

To date, CORIN has welcomed participants, including researchers, government officers, educators, policy makers, and scientists from 20 nations. We feel confident that they have benefited from our courses as each year the number of interested individuals grows, many of them referred to us by former participants.

CORIN's course content is broad because we feel there is a need to provide participants with a strong base of information. In the future, CORIN would like to offer at least three courses per year. Our goal is to continue to offer workshops that focus on the process of integrated coastal management, while developing courses that provide more hands-on experience with tools and techniques (e.g., GIS, Remote Sensing). We also would like to offer courses that deal with management of specific habitats. Hopefully, CORIN can develop a module that we can package and bring to those neighboring countries which are in greatest need of coastal management strategies.

Before CORIN was established, the Faculty of Natural Resources only offered undergraduate courses. As one of CORIN's missions, CORIN in conjunction with the Faculty of Natural Resources now offers a master's degree program in Coastal Zone Management. CORIN staff teach the core courses and allow students to learn from our experience and case studies. Lastly, we welcome students to do their thesis work at CORIN.

Students who work closely with CORIN have a great advantage as they are able to access faculty members from a variety of disciplines. One unique aspect of CORIN is that the core staff is comprised of individuals from natural sciences as well as social sciences.

CORIN STAFF

Our initial goal was to have a core staff of ten and we have nearly fulfilled that goal (CORIN also has a network of associate staff which we rely on to provide expertise in specific areas of research and study). Lastly, we have other contacts within and outside the university that we utilize on a project-by-project basis.

CORIN's network of staff and associates is not limited to those individuals working at PSU; rather CORIN is blessed with regional and international contacts. For example, there are a variety of individuals in Canada, the United States, Spain, Denmark, and The Netherlands who are interested in providing assistance and technology. These individuals realize the need in Asia for strong and effective coastal resources management

and are eager to transfer their technology. Year by year, CORIN is growing to become not only a regional body but also an international one.

Despite the fact that one of CORIN's role is education, CORIN is still learning and consistently trying to strengthen itself. For example, one of the case studies that CORIN worked on was in the area of Pak Phanang. CORIN staff benefited from this experience. We learned how to use tools to collect data to support the planning process. CORIN also learned about management arrangements in terms of the need to see how the players/institutions use resources and the niche that CORIN can fill among the players.

These lessons have proven to be quite significant to CORIN as they have molded and shaped our ideology. Moreover, we have transferred the results of our experience to other projects with which we are currently involved.

CORIN TODAY

The development concept of CORIN is that it is crucial to create a holistic integrated resource management strategy that is based on an understanding of both the science and politics of resource management. To deal with coastal resources, that are complex in nature, CORIN recognizes the importance of coordination among professionals from different disciplines. CORIN employs a programmatic development philosophy that utilizes complex management issues as tools to strengthen communities and institutions as cooperative, interrelated project participants. Apart from the core staff members, CORIN works with a number of professional workers of various disciplines, both at PSU and from other agencies and institutions. CORIN is well-placed as a coordinating link to the multidisciplinary expertise at the university. CORIN is capable of providing a diverse spectrum of highly qualified professional inputs required by ICM programs. Additionally, CORIN continues to host visiting international research scientists and is currently facilitating its visiting Fulbright scholar in research on coastal resources management issues.

Since its establishment, CORIN's staff has developed considerable experience in working with local governments and citizens to understand coastal resources issues, such as the exploitation of mangrove areas and the shift from rice cultivation to intensive shrimp farming. The CORIN research teams employ socioeconomic surveys and ecological, hydrological, and water quality studies to document problem areas and formulate management strategies.

CORIN is currently developing a computerized database on resource management strategies which are available to the public, government, and academic researchers at its information center at PSU.

CORIN largely operates independent of the univer-

sity budget and over the years has been supported by a number sources including the USAID MANRES Program; the Government of The Netherlands; the European Community; the British Government, ODA; the Government of Canada; CIDA; the International Center for Living Aquatic Resources Management ICLARM; and the Thai Government, DTEC.

CORIN is presently involved in a number of projects. Some of the most significant ones are highlighted here.

- Watershed-based approach to problem identification Nakhon Si Thammarat; 1991 to present
- Application of GIS to coastal resource management Nakhon Si Thammarat, Koh Samui; from 1991 to present
- Feasibility study on rehabilitation and resettlement program for abandoned shrimp farming areas Nakhon Si Thammarat, Samut Sakorn; 1993, completed in March 1995; NESDB
- Policy development on poverty, equity, and sustainability in the management of capture fisheries in southern and southeast Asia 1991, completed in 1994
- The environmental management of coastal aquaculture: a study of shrimp culture in Southern Thailand 1994, completed in 1995
- Master plan for shrimp culture in Sabah, Malaysia late 1993 (two-year project)
- Mangrove Rehabilitation: a community-based approach Songkhla, Pattani, initiated late 1993 (three-year project)
- Coastal ecosystem responses to deforestation and derived siltation (for critical habitats: mangroves, coral reefs, sea grass beds) Phuket; Trang; late 1993 (three-year project)
- Annual training short course on Integrated Coastal Zone Management. Various localities, three weeks annually since 1992

CORIN has made some impact regarding how coastal resources are viewed and utilized. Yet it is evident that the need for wise and sustainable coastal resource management plans is more crucial than ever. CORIN will dedicate itself to:

- Setting up and maintaining a good database with as much information about coastal zone management issues as possible
- Educating and training individuals in government and private sectors about integrated coastal zone management including human resources development

- Being an active recognized group of professionals who function as a team to address the critical issues for wise management of Thailand's precious coastal resources

COASTAL RESOURCE MANAGEMENT: EDUCATION AND CAPACITY BUILDING IN GOVERNMENT, COMMUNITY, AND THE UNIVERSITY

Kenneth R. Brown

Institute for Coastal Resource Management
University of Technology
Sydney, Australia

ABSTRACT

Coastal Resource Management education is relatively new and suffers (or perhaps benefits) from the lack of an established and traditional discipline base. As such, it benefits from the multidisciplinary approach taken at the University of Technology Sydney, and indeed, this was a major reason that a course was introduced. The course derives benefit from its close linkages with government (national, state, and local), NGOs, industry, and communities—in short, all possible stakeholders in coastal management.

INTRODUCTION

Recent events have encouraged the development of a Coastal Resource Management Program at the University of Technology Sydney (UTS). Postgraduate programs have been designed for those who have taken an undergraduate program in a variety of disciplines including science, business, management, economics, tourism, law, building, architecture and design, and engineering.

The goals of the program are to:

- Offer interdisciplinary professional courses for work in industry and government
- Conduct the research needed to improve the management of coastal resources
- Collaborate with industry and government to identify areas of concern
- Provide consulting and information resources to industry and government
- Help provide effective solutions to the complex problems of this area of study
- Enhance community education and awareness in this area

- Provide the professional skills to work in integrated teams for environmental problem solving, planning, and management

An underlying philosophy of the program is to equip the graduate with the skills of a manager and team member. These future managers will take responsibility for decision-making and conflict resolution with respect to coastal resources in government (at various levels), industry, and even the community.

The Institute for Coastal Resource Management is able to achieve its aims because it

- Does not see issues simply as either or but instead, considers the economic, environmental, social, and industrial perspectives
- Concentrates on a multidisciplinary approach
- Is dedicated to an open, participatory process involving academia, government, industry, and community

Graduates of the program are prepared for a career in coastal resource management as a consultant or working in government, community, or industry.

COURSE OFFERINGS

The program has a professional postgraduate qualification offered by the multidisciplinary Institute for Coastal Resource Management. Apart from the master's degree, graduate diplomas, graduate certificates, and doctoral degrees, continuing professional education programs are offered.

The courses (by semester groupings):

1. Principles of Resource Management

Coastal Resource Policy
Biosystems
Coastal Environmental Chemistry
Coastal Geology
Estuarine and Coastal Hydraulics

2. Resource Evaluation

Coastal Biological Resources
Geological Resources and Development
Resource Measurement and Assessment

3. Coastal Management

Coastal Management and Administration
Recreation, Tourism and Natural System Management
Integrated Environmental Assessment and Management

4. Legal and Economic Principles

Law and Coastal Resources
Experimental Design and Resource Management
Environmental Economics and Ecologically Sustainable Development

5. Policies and Planning

Coastal Resource Management
Coastal Planning and Development
Pollution Assessment and Monitoring
Leisure and Tourism Planning

6. Advanced Multidisciplinary Project

Individual research project in CRM

Note: During several semesters, students work in teams, undertaking projects designed to extend themselves in coastal problem solving. During one semester, teams of three or four work with local community groups, and in another semester, teams work with a government department(s).

Multidisciplinary projects are an essential component of the program. The project is seen as a test of a student's ability to tackle a project in a multidisciplinary fashion, involving multiple stakeholders and drawing on local community support and government support. In 1994, eight students completed the project with the support of local government (five students), state government (two students), and Commonwealth (one student).

BACKGROUND

Following the McKinnon report "Oceans of Wealth" in 1989, a UTS task force (see Fig. 1) received a special Department of Employment, Education and Training (DEET) National Priority (Reserve) grant to investigate the need and desirability of establishing a Coastal Resource Management (CRM) course in Australia. This grant also provided basic support for curriculum design. The multidisciplinary master's degree in Science (CRM) is a unique degree in Australia and represents an outstanding collaboration across the five faculties involved.

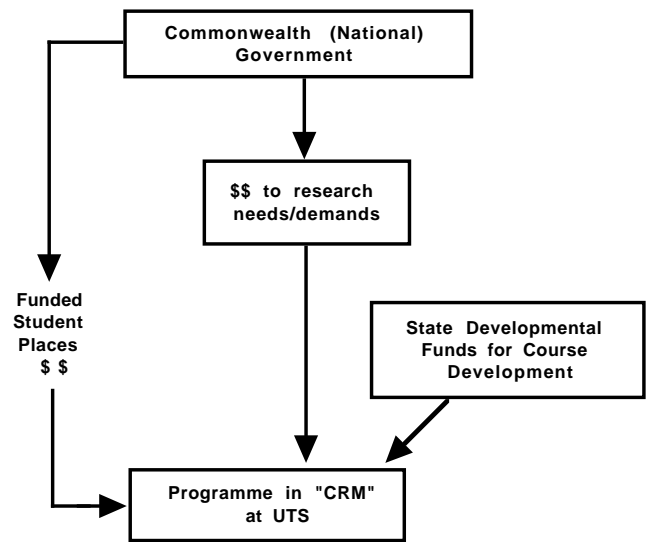


Figure 1. The developmental process in establishing the coastal resource management course (and Institute) at the University of Technology Sydney.

The need for extensive collaboration with government agencies, industry, and community groups was judged to be an integral component of the course and Institute in:

- Conceiving the course to meet identifiable needs of the stakeholders
- Designing the course, setting objectives, curriculum development
- Teaching the course, provision for visiting lecturers from government and industry
- Monitoring and revising the course and student assessments
- Funding arrangements, endowments of a chair or visiting chairs, equipment, gifts
- Sharing other resources (e.g., libraries, laboratories, field stations)

- Provision of students for the course and subsequent employment of graduates.

In recognition of our involvement with industry, the Institute was given two grants (\$254,000) from the NSW Education and Training to establish short courses and training modules leading to graduate certificates or diplomas in association with industry and other groups.

In 1993, the research component had been given a fundamental boost with an ARC Mechanism B Infrastructure grant of \$240,000. This was seen as further support from the Commonwealth Government and the University for the program. The University ranks all nominated projects and the Commonwealth granting body either approves of those rankings or makes its own. The CRM proposal was primarily ranked by both.

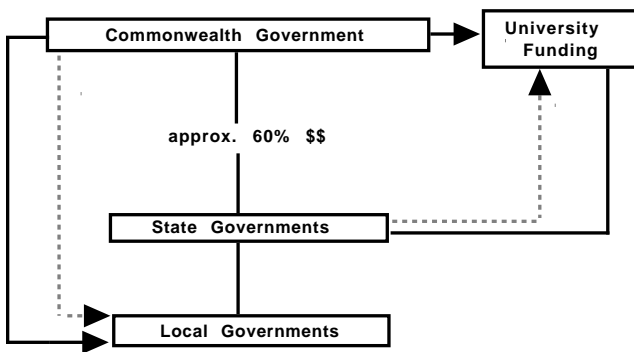


Figure 2. University funding arrangements in Australia

DEVELOPING THE COURSE

Participants. In Australia, university funding is largely derived from the national or Commonwealth government. Additional funds may be derived from state governments. The University funding from the Commonwealth government (see Fig. 2) is based on approved courses and student entry. As a metropolitan university (and third largest in Sydney), only limited prospects for growth and expansion are permitted by the Commonwealth. Despite this, and in line with the proposal, UTS had set aside 15 effective full-time student units (EFTSU)—five from each of the Faculties of Science, Business, and Engineering—per year from its limited growth profile in 1992 for the CRM program. This would allow for a total enrollment of 45 students over a three-year period. The students would reflect a mix of environmental science, tourism and recreation, legal, planning and business (finance and economics) backgrounds.

Curriculum Development. From the outset, the program was thought of as a joint venture between five faculties and government/industry. Accordingly, an Advisory Board was being established, with representatives from

all possible stakeholders. The constituents included representatives of government departments like fisheries, planning, national parks and lands. Government agencies included the Water Board, EPA, and the Maritime Services Board. Finally, other groups included community organizations such as conservation groups and NGOs like tourism and the Sydney Coastal Councils. Curriculum development was undertaken in full collaboration with these constituents.

Degree. The initial concept both broadened the graduate level material by the multidisciplinary approach and increased the depth of studies. Initially the mode of study was part-time, requiring employees to be released for at least one afternoon per week. The program as initially established was part-time for three years, although it has become a two-year program. A short dissertation is required in the final semester of the master's degree.

Funding. This course is fully subsidized, although it is intended that full-fee paying overseas and Australian students will be invited to participate.

Further Developments. The course was established with the intent to take students from a wide variety of government departments, agencies, industries, and community groups. This has been achieved, and to further increase its diversity, a graduate diploma (the master's program but without the research project) and graduate certificates were introduced in 1994. These programs are not subsidized and require that fees be paid. This is attractive to local government. Three students took advantage of this program in 1995.

RUNNING THE COURSE

When the course began in 1992 with the planned cohort of 15 EFTSUs, 24 part-time students enrolled. There has been a retention rate of 92 percent. This group will graduate in early 1995.

Subsequent Cohorts. In 1993, 12 full-time students and 10 part-time students enrolled. Following a slump in enrollment in 1994 (six new students—typical of the economic slump throughout Australia), 17 new students enrolled in 1995. Their backgrounds are varied ranging from business (including banking), law, science (biology, geology), and resource management. The majority of the new students are from outside UTS. There are no restrictions on age or gender. Students must meet the academic entry requirements and have management potential.

Refinement. The course is under continual review and has been changed when necessary to keep it in the forefront of the stakeholder's needs and requirements.

Government/Industrial/Community Support. Support takes the following forms:

- Representatives sit on the Advisory Board
- Industry provides facilities for laboratory or field work
- Students are released to attend classes
- Fee payments
- Provision of some visiting lecturers
- Selection of dissertation topics and assessment in conjunction with academic staff
- The project in the final year is paid for by industry, or conducted within industry, thereby ensuring a direct-user benefit
- Access to staff and students for research and project work.

RESEARCH

The collaboration between industry, government, and agencies has produced a range of research projects including estuary management (Port Stephens Local Government, \$17,000), Gore Cove Benthic Fauna (Shell Refinery Australia Pty. Ltd., \$85,000), Pacific oysters (NSW Minister for Fisheries \$10,000), and the Hawkesbury Ecotoxicology project (Sydney Water Board \$495,000). Recently, government funds (commonwealth/state/local) have been received to develop mariculture proposals in the Wallis Lake and Shoalhaven areas. These, together with the review of oyster management in the state mariculture technology parks, have totalled in excess of \$150,000 during 1993/94. From 1991-1993, the academic staff of the Institute have attracted research funds in excess of \$2 million. While collaboration across faculties has been slow to develop, benefits have started to emerge in the form of improving the opportunities for promotion and successful applications for grant funds.

With internationalization, other benefits have accrued such as academic and student exchanges. Opportunities are now being, or have been, pursued at the Universities of Rhode Island, Massachusetts (Boston), Delaware, Miami (Florida), and Simon Fraser (Vancouver, B.C.) to ascertain the feasibility of these exchanges as well as linkages to Asian institutions including Tottori University (Japan). CORIN (Coastal Resources Centre) at Prince Songkla University Thailand, has already expressed a desire to establish a bilateral research project which would be supported from Australia by AIDAB. The first Memorandum of Understanding has been signed between the University of Rhode Island and UTS. Doctoral, master's (by research), and honors students now (1994/95) have research programs in CRM.

WHAT BENEFITS ARE EXPECTED?

The expectations and benefits from collaborating with industry or government are many and varied. While each side of a partnership may differ, they may be summarized thus:

The UTS Institute for Coastal Resource Management will:

- Grow
- Improve its reputation and, by extension, that of the University
- Develop its research activity
- Potential to use the masters' course material to set up short courses and distance learning packages
- Improve knowledge of industrial, governmental, and agency procedures and operations
- Increase educational opportunities
- Increase access to company material and real case studies
- Contribute academic knowledge to industry and government

Whereas industry and government would expect the following benefits:

- Opportunities to influence curricula development and institutional thinking
- Recruitment and retention of high-quality graduates
- Opportunities to collaborate on research
- Public relations spin-offs
- A means by which industry/government and their customers could speak the same language
- Staff development opportunities leading to more committed staff
- Relating academic work to professional experience
- Access to ideas, practice, and higher education resources

GOVERNANCE

In Australia, the internal structure of universities has been left largely to the universities and the state governments. Basically, Australian universities consist of a number of faculties, schools and/or departments (see Fig. 3). There is a trend to reduce this governance to two tiers. The Centres and Institutes are seen as bodies created for specific purposes, and they are not responsible for academic programs. Rather, they may complement and provide a focus for those programs which lie within the conventional academic unit.

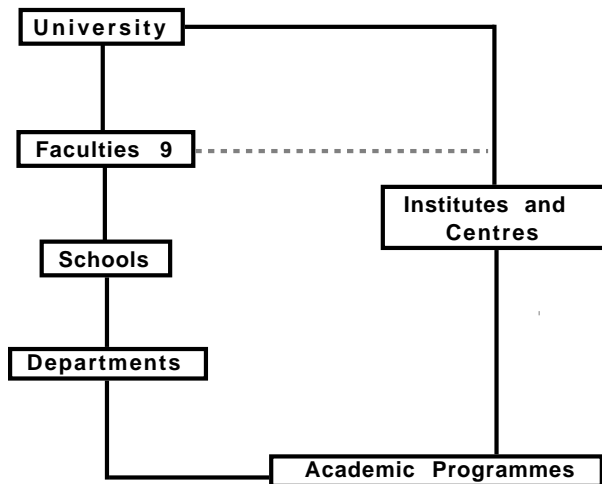


Figure 3. The internal governance of the University of Technology Sydney is based on the nine faculties, each of which is divided into a number of schools or departments. Centres and Institutes link the faculties or are internal.

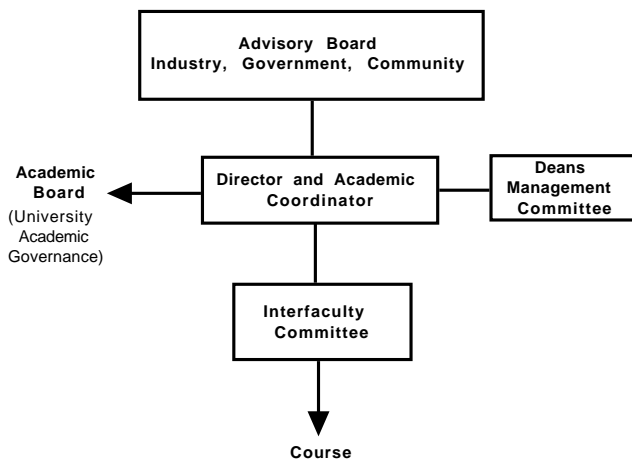


Figure 4. The internal governance structure of the Institute for Coastal Resource Management and its linkages across the university.

An advisory board consisting of representatives from interested stakeholders in coastal management includes fisheries, the water board, national parks, CALM, maritime services, and community groups, such as Landcare, Catchment Committees, tourism and recreational activities, meets at least twice a year to advise the Management Committee and Director (see Fig. 4).

The Director and Business Manager are involved in an intensive liaison with government and industry in Australia and overseas. Both were involved with the RAC Coastal Zone Enquiry and its various aftermaths, as well as state inquiries.

LIMITATIONS

The main limitations are the lack of dedicated staff to the program and a location or "home." Academic staff are drawn from five faculties (an advantage) and government. Both the director and academic coordinator have other major responsibilities in the university administration such as teaching programs. So the time and energy devoted to the Institute must be done in addition to these other responsibilities. Nevertheless, this may be an advantage as it provides an academic "home" and encourages the cross-disciplinary fertilization which is the strength of the course.

BUILDING CAPACITY FOR COASTAL MANAGEMENT AT UNIVERSITIES

J. Stanley Cobb

Department of Zoology
University of Rhode Island
Kingston, RI, U.S.A.

ABSTRACT

As the need for integrated coastal management is recognized and grows around the world, so does the demand for well-trained coastal managers. The education of these coastal managers will be centered at universities, but there are very few universities with the experience and resources to meet the demand. This paper addresses some of the issues of strengthening the capacity of universities so they are better able to prepare the next generation of coastal managers. Most of the lessons outlined here were drawn from the experience of the Coastal Resources Center at URI. It is critical to recognize the stage of development of an institution when establishing programs or strengthening individuals. Strategic planning is an important part of the process of a strengthening program since it provides clear steps for the future and builds consensus among members of the group. Support from university and government leaders is another key component for developing a successful program. A long-term commitment is needed from the university and partners in the strengthening effort. Finally, implementing a new curriculum, as is likely to be necessary for the educational program, is both an intellectual and a political exercise that must be approached carefully. A possible strategy for building university capacity could be to develop a network of "partner" universities that could provide opportunities to each other for faculty analysis and strategic planning and assistance in curriculum development. The partnership might be built on the principles of collaboration, information exchange, and participation in small management projects.

INTRODUCTION

The field of Integrated Coastal Management (ICM) is relatively young. Twenty years ago there were approximately 50 programs, most of which were located in developed countries and mostly in the United States. In 1993, there were more than 140 programs in 47 nations (Sorensen, 1993). The rapid growth of coastal management has been propelled by the great economic and ecological importance of coastal environments and the rapidly expanding human population in coastal areas. Coastal management agendas have been incorporated into existing environmental management agencies or planning agencies in many countries. In some countries, independent coastal management agencies have been established. Much of the growth

in coastal management is taking place in developing countries (Sorensen, 1993). The proliferation of coastal management programs has created a demand for practitioners skilled in various aspects of ICM.

It is clear that a cadre of new professionals needs to be created to meet the demands of this new and growing discipline. Stephen Olsen, URI, has written about the skills and knowledge required for coastal managers (see page 3). He points out that there are at least two aspects central to success—the development in individuals of systems thinking and the capability for practicing adaptive management.

Developing individual expertise in ICM can best be addressed with specific skills training and through education at universities. When coastal management pro-

grams in the United States were created, university programs and curricula that provide an interdisciplinary approach to marine affairs and ocean management were established to meet the growing need for practitioners (Crawford, et. al., 1993.) Graduate degree programs have been started in a number of universities in other developed countries including Canada, Australia, and Great Britain. However, there are no established university degree programs in coastal management in developing countries, and there are few ICM institutes or centers at universities. There clearly is a need for university-based education for coastal managers.

Universities play many roles in addition to education. Two of the most important are research into scientific and policy problems and the provision of a "place" outside government where the major issues can be debated in a neutral, or relatively neutral, atmosphere. The discovery of new knowledge, or the reinterpretation of current knowledge, is critical to all fields but especially so in an emerging discipline such as ICM. Universities are ideally suited for this endeavor. In many—but not all—parts of the world, universities are viewed as places where ideas and issues can be discussed and debated in a relatively apolitical way. If there is to be a testing ground for new ideas in ICM, universities are likely to be involved.

Thus the role played by universities should be viewed as crucial to the sustainability of coastal management programs. The Coastal Resources Center (CRC) at the University of Rhode Island has assumed that the long-range prospects for success of a nation's coastal management program is enhanced when individuals are educated in ICM. CRC also assumed that joint government-university efforts enhance the development of sound coastal management policy. Universities can undertake research, assist in policy formulation, and ultimately adjust their curriculum to produce graduates with the knowledge and skills that ICM practitioners require. Part of the rationale underlying these assumptions was that CRC began as a university center that started as the planning and policy arm of the Rhode Island Coastal Program and later became a University center. Fostering such relationships between coastal management units that were USAID/CRMP partners and an in-country university was a feature of CRC's capacity-building efforts in Ecuador, Sri Lanka, and Thailand.

The purpose of this workshop is to facilitate the planning and development necessary for university-based education and training programs and to investigate the need to strengthen universities that are choosing to develop programs in coastal management. In this paper I will draw from the lessons learned from the work done by CRC. I will also suggest some strategies for developing ICM programs at selected universities that may be a starting point for discussion during the workshop.

APPROACH

The Coastal Resources Center at URI helped develop research and educational expertise and programs at universities using various strategies. It was not always a clearly stated goal of the long-term coastal management projects in Ecuador, Sri Lanka, and Thailand undertaken through CRC's USAID-funded Coastal Resources Management Program. Nevertheless, there were some clear themes to the approaches that were employed. The first and most important was to build links between government agencies involved in ICM and universities. This was started and facilitated by asking CRC's counterpart agency to identify one or more academic institutions as a partner. Faculty members were contracted for some of the work, focusing on research needed to support the development of coastal management policies. This builds expertise in individuals and often involves students in the work. A second strategy was to foster the development of a unit (center or institute) devoted to research and policy planning for ICM at a selected university in the country. A careful organizational analysis and strategic planning at the outset of initiation of the unit was an important step. When technical assistance was provided to projects being conducted by university staff, they often worked as counterparts and learned from each other. This was particularly true in the development of joint training courses presented at partner universities. Other, more traditional strategies also were used, such as study tours, exchange visits, training courses, and fellowships for degree programs in the United States. During the last 10 years, CRC has learned a number of lessons.

LESSONS LEARNED

By working with partners at several universities, CRC has gained valuable experience and learned some lessons about strengthening efforts. One obvious observation is that universities differ and a "one size fits all" approach will never work. The nature of a university depends upon its political and cultural environment, its mission, and its stage of development. Recognizing the stage of development of an institution is critical when planning appropriate steps to establish programs or strengthen individuals. An important first step in strengthening a program is to assess the strengths and weaknesses, and then begin the planning process. Support from university leaders (not all of these are administrators) is another critical component of developing a successful program. Finally, it is important that the participants and funding agencies recognize that to build a new discipline within a university may use a lot of money and time. In addition, a long-term commitment is needed.

STAGES OF DEVELOPMENT

Understanding the key issues that affect success and when they are likely to arise in the life cycle of an organization allows the issues to be identified and intervention to be planned so that the organization will continue to develop. The developmental stages of non-profit health delivery organizations were suggested by Vriesendorp, et. al. (1989). All institutions pass through similar phases, and universities in low-income countries face many of the same problems as other public institutions. I have modified the model of Vriesendorp et al. to be more appropriate for universities (see Table 1). In the early stages of development, the focus is on building facilities and acquiring teaching resources, building competence in faculty, and attracting quality students. During the growth phases, universities concentrate on building programs, defining missions, developing research strengths, and controlling change. Finally, mature universities face quite a different set of issues including initiating innovation. Most of the universities that CRC works with (ESPOL, Kelaniya, Peridiniya, Chulalongkorn, Kasetsart, Prince of Songkla, U. Philippines, Silliman) are in either the

growth or mature phases (although Chulalongkorn and Kasetsart clearly are established, mature institutions).

The nature of the relationship and the type of strengthening efforts to be used will depend strongly on the stage of development of the university. It also is important to factor in the stage of development of coastal management in the country—the two will interact strongly in the strategy planning for strengthening and developing programs.

CRC made deliberate strengthening efforts at two universities in different stages of development. In Ecuador, the Escuela Superior Politecnica del Litoral (ESPOL) is in the growth stage, having just moved to a new campus. Most of the faculty hold M.S., not Ph.D., degrees. Research is valued at ESPOL, and faculty are encouraged to do it, but few resources can be directed toward research support. Almost all the students who go to ESPOL are from coastal regions. The university is supported by a combination of government and international funds. In Thailand, Prince of Songkla recently moved into the intellectual advancement stage, having recently completed an enormous growth phase. CRC's relationship with PSU started during the growth phase.

TABLE 1: A GENERALIZED SCHEME OF THE STAGES OF DEVELOPMENT OF UNIVERSITIES, SHOWING CHARACTERISTICS AND KEY ISSUES FOR EACH STAGE.

STAGE OF DEVELOPMENT	CHARACTERISTICS	KEY ISSUES
Initiation	<ul style="list-style-type: none"> undergraduate only, students local faculty young with little training and are underpaid little or no research 	<ul style="list-style-type: none"> Funding, attracting students and competent faculty, role of government;
Growth	<ul style="list-style-type: none"> undergrad and a few graduate programs faculty generally hold MS degrees, may need other jobs, many away studying for advanced degrees research valued but not supported 	<ul style="list-style-type: none"> focus and control of growth (campuses, buildings, students); quality and breadth of programs, administrative capacity;
Intellectual advancement	<ul style="list-style-type: none"> graduate programs in place strong financial support from government research valued and supported students from region regional but not international focus many faculty studying for Ph.D. 	<ul style="list-style-type: none"> controlling change, developing research expertise, maintaining focus, attracting and funding research projects, curricular innovation, retaining key faculty
Mature	<ul style="list-style-type: none"> well known undergraduate and graduate programs, faculty older, teaching loads low, research known internationally, students from region and world 	<ul style="list-style-type: none"> initiating change, maintaining relevance, faculty governance, funding for new programs

Most of the faculty we collaborated with have M.S. degrees; the minority hold a Ph.D. degree. Many of the faculty on staff at PSU were away, at that time, studying for doctorates on fellowships from international donors. Funding for university programs and growth came almost entirely from the Royal Thai government. The university administration was very receptive to the initiation of a new center and able to appropriate significant funding to support it.

INITIAL ASSESSMENT AND STRATEGIC PLANNING

At the beginning of the project at each institution, an assessment of the relevant part of the institution was done. This served two functions: first, it was an opportunity for the principal participants to get to know each other, and second, a self-assessment paved the way for realistic planning. In each case, the National Aquatic Resources Agency (NARA) in Sri Lanka, ESPOL in Ecuador, and PSU in Thailand, the assessment included an overview of the expertise and training of the staff, the equipment available for research, and the issues facing the organization, as well as the nation, in coastal management. The possible nature of an institute was discussed in several meetings. The assessment and the simple fact that meetings were held was extremely important. Meetings both focused attention on the proposed changes and allowed people to modify and buy into ideas. The result of the assessment at NARA was a decision not to do very much, because the level of funding was very low, and there were significant difficulties within the organization. At PSU, on the other hand, an initial assessment was followed by an intensive strategic planning process that included meetings with potential CORIN associates, deans, administrators, and USAID. A planning document was produced (Boromthananarat and Cobb, 1990) that laid the groundwork for the initiation of CORIN, the strengthening program at PSU, and defined what was required to accomplish the program. Two separate planning efforts for a coastal center at ESPOL led to different conclusions. The first brief effort resulted in a plan for a relatively small research and policy institute without a major curricular component at ESPOL. The aim was to fund the program through a debt swap. The second effort, much longer and more complete, involved faculty from ESPOL and Universidad Catolica and targeted InterAmerican Development Bank funding. Funding did not materialize in either case. Thus the three institutions had very different funding situations: at PSU and NARA, funding was available through an existing USAID project. The funds for NARA were sufficient to support a very small program, while at PSU, the funding ranged from adequate to generous. Unfortunately, the funding was withdrawn by USAID shortly after the project began. Nevertheless, CORIN prospered because of the support of PSU and

other donors. At ESPOL, which was quite a different situation, the planning was done in hopes of obtaining funds.

INSTITUTIONAL LEADERSHIP

Involving university leaders is extremely important. At PSU, the vision and support of president of the university (Dr. Pasook) and the energy and contacts of the director of the Coastal Resources Institute (Dr. Somsak) led very quickly to a viable institute. The support of the president was invaluable, providing a sort of "protected status" to the institute and its director. President Phasook saw to it that appropriate office space was provided in the early planning stages and provided funds to create new space once the project was underway. Similarly, at ESPOL, Rector Flores was very supportive of attempts to plan a CRC/ESPOL and appointed a respected and admired scientist and administrator, Hector Ayon, to do most of the planning. This permitted access to the faculty and administrators who are needed for planning and proposal writing. Once the CRC/ESPOL was formed, a young and administratively inexperienced faculty member was chosen to be the director. He has since been replaced by a new dean. Funding for CRC at ESPOL still has not reached levels great enough to support significant projects. At NARA, the director general had many other administrative responsibilities. However, he took an entire day to attend a seminar on developing an ICM core group, an almost unprecedented length of time. It did not go unnoticed by staff and may have contributed to the initial success of forming a coastal management core group from which a more formal center may one day evolve.

As the person leading these efforts for CRC at URI, my own background and experience has also been helpful. As a member of the teaching faculty at URI and an active scientist with research interests in marine biology, I give seminars and occasional lectures in classes. These, in turn, have led to a good relationship with scientists on the faculty based on a shared background and mutual interests. I also have had some experience in university administration. As such, I can understand and sometimes anticipate problems that might not be apparent to someone without experience in some of the arcane ways of universities.

TIME AND MONEY

Building capacity at universities is time consuming and expensive. The nature of the intervention and how long it will take depends on the institution's stage of development. This takes approximately five to ten years. At universities in the initiation stage of development, many of the staff need training in English or another language before they are able to study abroad for a higher degree. This may take as long as two or three years per individual and can be quite expensive. Fac-

ulty granted fellowships for M.S. study can be expected to be away for two to three years and for a Ph.D. in science, up to five years. If the intervention includes on-the-job-training, what we call "learning by doing," either a resident advisor or frequent TA visits are needed. These are expensive, but they are important not only for guidance but for the personal contact and continuity. Providing equipment for scientific research by the center may or may not be an issue. New or updated equipment is significant. A new center needs a way to interest faculty from various disciplines.

In the first two stages, many faculty are likely to be away from the university studying for higher degrees (an MS—the initiation stage—and a Ph.D.—the growth stage). This will cause a significant decline in capacity of the university. This was particularly noticeable at CORIN, where a faculty associate who was particularly helpful in the beginning phases of the development of a special area management plan (part of the "learning by doing" strategy) went to Australia for a Ph.D. and three potential associates started studying for their doctorates at URI shortly after the project started. In other words, a decline in capacity should be expected when simultaneous overseas fellowships are provided. "Learning by doing" should take this into account.

A temporary decline in capacity can be somewhat mitigated by insisting that Ph.D. students do their thesis research in-country, on a topic relevant to the institution or project. This is not any more expensive or time-consuming than traditional study, and it provides considerable benefits including better communication between student and home university during the prolonged period away, a significant piece of research on a topic relevant to the institution (if it can be arranged), and the opportunity for the major professor to visit the country at least once to oversee the student's research. This arrangement worked well for the three PSU faculty studying for their doctorates at URI.

CURRICULAR INNOVATION

Developing innovative curricula has been difficult despite the considerable effort applied to the issues. Course offerings and new curricula have been discussed both at URI and at PSU. At URI, the Marine Affairs Department (MAF) offers undergraduate and master's degrees in Marine Affairs, with the possibility for specialization in coastal management. However, there is relatively little interaction, in terms of teaching, between MAF and CRC, and there has been little opportunity to incorporate knowledge from the CRMP into classes offered at URI. There is no formal impediment to interaction, rather history and personalities seem to play the greatest part in keeping the center and the department relatively separate. At a mature university such as URI, departments often take a conservative tack, guarding the knowledge of a discipline, while centers

play a creative role, moving into areas where traditional departments cannot. It is not surprising that there is a lack of understanding of goals and roles in such situations, particularly when the center developed, as is the case at URI, independently of the department.

A new M.S. degree in Coastal Management was written into the workplan for PSU. The plans for a new curriculum initially were stalled for several years, but recently an M.S. in Coastal Resource Management was established in the School of Natural Resources. There were two main reasons why it was difficult to develop a new curriculum. First, there was no group of people at PSU who knew enough about the discipline of coastal management to teach it. Second, shortly before the project started, PSU initiated an interdisciplinary M.S. degree in Environmental Management. The administration asked, quite properly, why they should support two new degrees in areas that seemed, on the face of it, quite similar. It was suggested that Coastal Management be made a specialization within the Environmental Management degree. However, it was decided that the present location, within the School of Natural Resources, was more appropriate.

At both URI and PSU, new courses and curricula have been suggested and discussed. The outline for an innovative curriculum in coastal management has been sketched. However, different internal constraints have slowed the development of an independent ICM curriculum. Curricula specific to integrated coastal management were enacted some years ago at technical universities in Australia and England. Perhaps such innovations need to be started at smaller, more agile universities, then later adopted by larger and more mature ones.

A small but important point arose indirectly from this project, through involvement at ESPOL, where the successful curriculum in oceanography is about to be discontinued. Oceanography will no longer be offered at ESPOL despite a continuing interest by students because there are too few jobs for their graduates. Successful programs that respond to a specific demand may one day saturate the market with individuals trained in that specialty. This is a real possibility for coastal management. When programs are created, they should be approached with this in mind, particularly in small countries or ones in which there are few resources for supporting coastal programs.

STRATEGIES FOR THE FUTURE

To members of this workshop, and coastal communities around the world, the development of a cadre of effective coastal managers is an important task. ICM is a new field, and there are very few universities in developed countries with curricula specifically addressing it. There are very few universities in developing countries with formal degree programs in coastal management, and only a few with institutes or centers devoted

to integrated management of coastal areas. Given how new the field is, this is not unexpected. However, it is clear that there is a great need to develop individuals who can work in government agencies, NGOs, and universities to initiate, support, and sustain effective coastal management in their countries. These individuals will be educated at universities. Therefore, it is imperative that efforts be directed at selected coastal universities to enhance their capacity in practicing and teaching coastal management. A number of strategies might be suggested to universities in developing countries that are or wish to be involved in the education of future coastal managers.

ICM can be thought of as ecosystem management in coastal areas. Practitioners in this field must be able to integrate concepts and information from a wide range of traditional disciplines spanning natural science, economics, law, anthropology, and human behavior if they are to produce, test, and refine resource management strategies that make a difference (Olsen, 1993). Schroeder (1993) identified five key components that must be addressed in order to achieve integrated management:

- The nature of the managed system
- The balance between economic development, environmental protection, and social values
- Legal and jurisdictional considerations
- Wide participation in decision-making and management
- A strategic and adaptive approach allowing change after evaluation

People skilled in each of these areas will always be needed. However, it is also clear that for effective action, we need people who are specialists in the art and science of integrative thinking for effective action. Education for integrated ecosystem managers should be designed "to impart the skills and knowledge required to be an effective agent of change in the rapidly evolving, technically complex field of ecosystem management" (Olsen, 1993). To accomplish this, universities must develop programs that are not confined within narrow definitions, but that cut across traditional fields in a transdisciplinary manner. This will not be easy, nor will it be quick because this approach is new and the field is new, and training new faculty, or retraining present faculty, is a long-term process. Change will require long-term efforts directed towards strengthening universities and individuals at those universities.

University strengthening has played an important role in international development efforts for many years. Typical interventions include fellowships for selected faculty to study toward an advanced degree,

equipment and other resources, and assistance with research or curricular projects. Often a university in a developed country will be linked with one or more universities in developing countries. This has not been a high-priority approach, particularly within USAID in recent years, and efforts directed towards university strengthening have declined. There is no indication it will receive high priority in the near future. Nevertheless, the issue is critical to the development of any field, particularly one as new as ICM.

BUILDING UNIVERSITY CAPACITY IN ICM

The fundamental strategy is to develop centers of excellence in coastal management at strategic locations in coastal universities throughout the world. Each center would draw upon faculty throughout the university to develop interdisciplinary teams of individuals to work on coastal management projects or teaching. To develop and strengthen these centers and the individuals associated with them, it might be useful to develop a "partner" relationship among selected universities and/or institutes that practice coastal management. The partnership would strengthen individuals and support course and curricula development that addresses integrated ecosystem management. It is likely that this will be done in sequence and over a relatively long period of time. Before a course can be implemented or a new curriculum proposed, individuals must be experienced in the practice of coastal management. There are four parts to this strategy:

- To provide opportunities to individual faculty for participation in coastal management projects
- To provide assistance in the planning for development or strengthening of centers and curricula
- To develop courses and curricula in coastal management in partnership with universities in other countries
- To build partnerships among universities active in coastal management to work together to implement the previous three.

OPPORTUNITIES FOR PRACTICE

One of the most successful strategies for learning is the simplest—to practice, with guidance, the tasks to be learned. Individuals at universities who want to learn more skills in coastal management can be encouraged to work on projects that will build their knowledge and abilities. CRC at URI has had ample experience in providing opportunities to university staff. However, most of these individuals were hired for their abilities, ensuring that projects were completed in an expert and timely fashion. If it were possible to provide funding for small stipends and travel support, then inexperienced individuals at partner universities who

wished to become experts in ICM could work along with, or under the direction of, seasoned ICM professionals on projects at partner institutions or in partner countries. These "Coastal Management Fellows" would perform tasks commensurate with their skills, and develop new capabilities. The nature of the tasks assigned might range from assisting in the preparation of a training course, to accompanying a seasoned ICM professional on a visit devoted to research or policy implementation, to perhaps a longer placement at a partner university. In all, the long range goal would be to develop the individual into a more accomplished CRM practitioner.

INSTITUTIONAL ANALYSIS AND STRATEGIC PLANNING

Strengthening organizations is a complex and lengthy procedure and involves many activities. Central to these activities is the strategic planning process, a defined and organized effort to make decisions and propose actions that will shape the future of the institution. The members of the organization jointly decide what the organization is, what it does, and why it does it. The process requires gathering information about the organization itself, and about the environment in which it operates. It also requires participation and communication among members of the organization, which will, in the long run, assist in the implementation of the plans. CRC has had some experience in providing strategic planning in university settings. In partnership with experienced members of a coastal management university network, planning advice could become readily available to other universities as they embark on the development of new efforts in coastal management.

COURSES AND CURRICULA

The education of a cadre of coastal managers will require the development of new courses and curricula at universities. Activity along these lines has already started, particularly in developed countries, with a few universities in several nations offering degrees in coastal management. In developing countries, although no formal programs are in place, discussions have started, and are being facilitated through international workshops addressing the nature and structure of education supporting integrated coastal management. Assistance may be offered for the development of courses and curricula at universities in several ways: with planning assistance for courses, curricula and training sessions, through the presentation of workshops and facilitation of study tours, by facilitating sabbaticals and leaves for teaching coastal management at overseas universities, and by developing and providing for a small library of coastal management books.

It may also be possible to develop an international master's degree in coastal management offered by URI

and partner universities in other countries. This program might be made up of an interdisciplinary team of faculty drawn from URI and other universities, perhaps starting with those represented at this workshop. The core of the course work could be offered at the University of Rhode Island, while specialty courses and field work for the thesis would be offered at partner universities. A program such as this might be developed through discussion with the URI Marine Affairs Department. The workshop paper by David Gitlitz explores these ideas further (see page 119).

PARTNERSHIPS

Accomplishing these goals will not be easy. Each goal, however, suggests building on the experience of others and working in collaboration with individuals at other universities. A way to implement this might be to develop a formal partnership among selected universities interested in coastal management. A partnership should be built on the principles of collaboration, information exchange, and participation in small, focused, coastal management projects. A partnership would link universities, each with its own coastal management team. Four goals might be suggested:

- To increase the collaboration among individuals involved with coastal management in developed and developing countries
- To strengthen individuals and institutions in their ability to conduct research, policy development, and planning in coastal management
- To promote good quality research, policy development, and planning efforts in developing countries
- To promote the exchange of information and experience among members of the partnership

A partnership will require a center where communication is facilitated and funding can be coordinated, as well as providing and administering funds for small grants for coastal management initiatives which are distinctly collaborative. Collaborators would come from the partner institutions themselves as well as international experts. The partnership could run workshops on topics of interest to the collaborators, publish a newsletter, proceedings of workshops, and support the publications of articles by members. It should support faculty and staff exchange visits among member institutions. Finally, the partnership would assist in developing of curricula and training courses through technical advice and helping to find funding.

The partnership might provide small amounts of funds to stimulate interdisciplinary approaches to coastal management at the partner institutions. The emphasis should be on projects that are site-specific and oriented towards policy and planning, and engage the participants in the process of governance. Each of

these would include many or all of the components of Integrated Coastal Zone Management: ecological appraisal, institutional and legal analysis, public awareness and public education, policy planning and formulation, and implementation. In each component, local and national government must play an important role, and, from the beginning, will be deliberately brought into the project and linked to the university partner.

REFERENCES

- Boromthanarat, S. and Cobb, J.S. (1990). *Planning for the future: a strengthening strategy*. CORIN working paper #1, Coastal Resources Institute, Prince of Songkla University, Hat Yai, Thailand.
- Crawford, B.R., Cobb, J.S. & Friedman, A. (1993). Building capacity for integrated coastal management in developing countries. *Ocean and Coastal Management*, 21, 311-337.
- Schröder, P.C. (1993). The need for international training in coastal management. *Ocean and Coastal Management*, 21, 303-310
- Vriesendorp, S., Cobb, L., Helfenbein, S., Levine, J., Wolff Jr., J. (1989). *A framework for management development of family planning programs*. Paper presented at the 117th meeting of the American Public Health Association, Il. Chicago, Il.
- Sorensen, J. (1993). The international proliferation of integrated coastal management efforts. *Ocean and Coastal Management*, 21, 45-80.

CAPACITY BUILDING: A CASE STUDY OF THE MARINE SCIENCE INSTITUTE, UNIVERSITY OF THE PHILIPPINES

Edgardo D. Gomez

Marine Science Institute
University of the Philippines
Quezon City, Philippines

ABSTRACT

The Marine Science Institute at the University of the Philippines has grown from a single office in 1974 to an institute with many faculty and staff, several buildings, and active research, outreach, and graduate degree programs. Key factors in the development of MSI were clear goals, leadership, staff development, and fostering a spirit of cooperation. Budget growth, which was very rapid is modest now, imposing constraints on further growth of MSI.

INTRODUCTION

The Establishment of the Marine Sciences Center.

The Marine Science Institute (MSI) started from very humble beginnings in 1974. With very limited resources, the University of the Philippines (UP) decided to establish a research center that was to be called the Marine Sciences Center (MSC).

Following the completion of my Ph.D. studies at Scripps Institution of Oceanography in 1973, I joined UP in June 1974 as an assistant professor with a concurrent appointment as Acting Director of the incipient MSC. But MSC at that time (June 1974) existed on two sheets of paper. One of the first things to do was to find space where I could set up the office. I was fortunate enough to get office space in the Natural Sciences Research Institute. But this Institute was being used by many departments. We had been given such limited space that I had to look around for more. An abandoned plant physiology building became our first laboratory which we used for about 10 years. Since these facilities were on the main campus of the university in Metro Manila, it was necessary to look for a site for a marine laboratory on the coast. In the early 1980s, construction of the Bolinao Marine Laboratory (BML) began with a modest building. Subsequently, funds were provided by the Philippine government as a counterpart to a UNDP project of MSI to expand the facility to its present state which includes eight separate buildings.

In its first 10 years of existence, MSC was purely a base of marine research at the University. Its manpower consisted of research and administrative personnel. Faculty members from the departments of botany, zoology, chemistry, and the College of Medicine were doing research with the Center.

The Transformation into the Marine Science Institute. The Marine Sciences Center was transformed into the Marine Science Institute (MSI) in 1985, while the Departments of Botany and Zoology ceased to exist as separate departments and were fused into the Institute of Biology. A number of the faculty members of Botany and Zoology joined the new MSI. The Institute adopted the master's degree program in Marine Biology which used to be administered by the Department of Zoology. The newly established Bolinao Marine Laboratory (BML) served as the site for various research groups. At about this time, the first students who had finished their doctoral studies abroad started to return to augment the faculty ranks. These former research assistants of the MSC had done well.

THE MARINE SCIENCE INSTITUTE

Mandates. The transformation of MSI from a Center to an Institute takes into account its capacity for functional expansion. The main thrusts of the Institute are research and instruction. Extension services being

developed. It operates to meet three specific objectives:

1. To generate basic information necessary for optimal and sustained utilization, management, and conservation of the marine environment and its resources.
2. To provide graduate level training and extension services to develop manpower requirements in marine sciences.
3. To develop appropriate and environmentally sound technology for industrial and economic development related to marine resources.

The MSI is headed by a director who is assisted by three deputy directors—one each for research, instruction, and the BML. MSI is a small department although, as of today, it has 14 faculty members. There are no bachelor's or master's degree holders on our faculty because our recruitment procedures are different from other departments, many of which draw their faculty from among their graduates who have just completed their bachelor's degrees. In the case of MSI, those with bachelor's degrees are placed on the Research and Extension Personnel (REPS) track and make up the research staff. After they have earned a doctorate, they are taken back as researchers or as faculty members. In this manner, we are able to build a faculty made up entirely of those who hold doctoral degrees.

Instruction. The courses now offered at MSI are the M.Sc. degree in Marine Science with majors in Marine Biology and Marine Physical Science, and a Ph.D. in Marine Science. The graduate students are given the chance to undertake their thesis or dissertation research within the context of existing projects of the Institute. Through occasional grants, MSI is able to provide a limited number of scholarships to highly qualified students.

While we try to emphasize research, we do not sacrifice teaching. We are doing our part in terms of developing a graduate program. We are the only institution in the country that offers a Ph.D. program in the field of Marine Science. We have some 15 Ph.D. students in a program, which is about five years old now, and we have 36 master's degree students.

I believe we have produced some of the best graduate students in the College of Science, if not in the whole University. The Dean's medal for the outstanding graduate student started about a decade ago and, in that period, four of the outstanding graduates were from the MSI. I am confident we will produce more of the same calibre of students as we are determined to maintain the trademark of excellence in training and teaching young people to be scientists.

MSI also organizes and conducts training courses for both local and international participants. Both the MSI faculty and staff serve as trainers or resource speakers

for these training courses. These courses have tended to focus on methodologies related to specific disciplines or commodities (e.g., coral and seaweed taxonomy, giant clam culture, and benthic surveys). More recently, training courses have been done in relation to coastal resources management. It is through these training activities that the Institute has initiated its educational activities in coastal area management.

While there are no formal courses in this area, the possibility exists for evolving a curricular program, initially in collaboration with other departments of the university. The basic concept for this was mentioned in an earlier paper presented in Singapore (Gomez, 1991). Since the MSI faculty is presently limited to natural scientists, it would be necessary to rely on faculty from other disciplines to handle the courses outside the natural sciences. Such a program could involve a collaborative arrangement with the College of Social Work and Community Development with which we are currently working on a community-based coastal resources management project in Bolinao, Pangasinan, the site of our marine laboratory. No concrete steps have been taken to create a curriculum, although the results of the Singapore workshop and the recommendations emanating from this meeting could be a beginning.

Research. MSI has expanded its capabilities for conducting scientific research by training its technical personnel and by enhancing the research facilities through grants and cooperative research. Our research includes the biology of red tide-causing organisms, plankton ecology, coral reef and seagrass ecosystems, seaweed and invertebrate biology, mariculture, nearshore and offshore oceanographic processes, biochemical studies on conotoxins, and natural products chemistry of seaweeds and invertebrates. All members of the faculty are engaged in research work. From less than 10 researchers when MSC was first established, we have increased the number of research staff to more than 100. Our selection procedure assures that we hire the cream of the crop and the various trainings and challenges that become available to them make these research personnel better trained.

MSI has established linkages with a number of national organizations including the Philippine Council for Aquatic and Marine Research and Development (PCAMRD), the National Research Council of the Philippines (NRCP), and the Philippine Association of Marine Science (PAMS). The Institute is also represented in the following international organizations: the Asian Fisheries Society, the Association of Southeast Asian Marine Scientists, the Joint Group of Experts on the Scientific Aspects of Marine Protection (GESAMP), the World Conservation Union (IUCN), the International Association of Biological Oceanographers (IABO), the Pacific Science Association (Scientific Committee on

Coral Reefs), the Scientific Committee on Oceanic Research (SCOR), and the Scientific Steering Committee of the Land-Ocean Interactions on the Coastal Zone (LOICZ) of the International Geosphere-Biosphere Programme (IGBP).

Outreach. As the Institute expands its capabilities, there is more pressure to perform services for other institutions outside of the instruction and training mentioned previously. As might be expected, service areas have been limited generally to the expertise available in the Institute. It is gratifying to note, however, that from a few biological topics, the scientific manpower in the Institute has expanded to include the physical sciences. In some instances, the Institute's capabilities are complemented by those of other departments. As a concrete example, the Institute is assisting the capacity-building initiatives of a state college in the southern island of Mindanao. Another department of the University is assisting them in the field of geological sciences.

Another initiative the Institute has undertaken is networking in the marine sciences. Through a series of workshops on the marine science capabilities in the country, it was learned that communication and linkages needed to be improved upon among individuals and institutions. Out of this need arose the establishment of the Philippine Association of Marine Science (PAMS) which now links virtually all institutions in the country with established marine science programs. This association holds periodic national symposia that serve as a way for marine scientists from all parts of the country to meet. While the MSI catalyzed the formation of PAMS, the latter has a charter of its own. Nevertheless, MSI continues to give substantial support, now mostly moral support, since it is the largest and strongest single unit in the field of marine science in the country and trains staff from many of the other marine science-related institutions including fisheries colleges. This model could serve as a prototype for capacity building in developing countries.

Facilities. The facilities of MSI meet the instruction and research requirements of the faculty and the staff. The main building (10,000m²) is located in the science complex of the Diliman Campus of the University. It is equipped with research laboratories, classrooms, audiovisual facilities, a library, a museum, and an herbarium.

Even before the MSI building was constructed, the Institute was able to get two sizable grants from what was then the Department of Natural Resources (now known as the Department of Environment and Natural Resources). One grant funded the Seaweed Processing Project which allowed us to set up the Seaweed Chemistry Building and Pilot Plant. We developed the technology to process our seaweeds which were being ex-

ported raw. Thus the pilot plant was set up and the Institute was indeed able to develop a process and to patent that process for carrageen. The other big project was the investigation of coral resources in the Philippines. This project allowed us to build a second building, referred to as the Coral Laboratory.

Both of these projects cost something on the order of P200,000 to P300,000 (USD 35,000-50,000 in 1980), but with that money, we were able to build two buildings. So, while we did not have our own buildings, we were able to construct these two small laboratories which became the powerhouse that allowed us to gain credibility in the field of marine science.

The Marine Science Institute has other facilities. One of these is the Bolinao Marine Laboratory (BML) which sits on a five-hectare piece of land on the shores of Lingayen Gulf in Pangasinan. Our facilities include the main laboratory, the administration building, the diving locker, dormitories, and housing units for senior staff. It also has culture tanks in which giant clams, lobsters, sea urchins, and seaweeds are grown. An ocean nursery for giant clams is set up in the field. These are enclosures with plastic cages where juvenile clams are kept until they are large enough to escape predation, at which point, they are set on the sea bottom in shallow water.

The BML also houses a number of small skiffs and boats, basic field instruments and scuba gear, computers, and other specialized laboratories for trace elements, biochemistry and toxinology, organic chemistry, and natural products. Other laboratories focus on seaweeds, seagrass, energy dynamics of coral reefs, and plankton ecology. Besides doing work in the laboratory, the Institute also conducts research at sea. This is done in collaboration with agencies with research vessels.

Having had a series of projects funded externally has allowed us to slowly acquire equipment. Right now, we have about two to three computers per project leader. And if we were to include the research personnel, we could have perhaps one computer for every two people at the Institute.

Why this emphasis on computers? Less than a decade after my doctoral studies, I had the opportunity to visit my alma mater. I was surprised to see that the secretaries each had a computer station. I told myself that in order to keep up with the rest of the scientific community, we had to go electronic. Otherwise, we would never be able to do our work at the rate that the developed world was advancing. So we made a very strong attempt in the early 1980s to get some of our original PCs. We were able to buy a Radio Shack TRS-80 and, subsequently, get a donation of a KayPro. Then the IBMs and the IBM compatibles started to come in. Now, everybody wants a personal computer, both for word processing and data analysis. I feel that unless we

catch up equipment-wise with the rest of the world, it is going to be difficult to keep abreast.

Another feature of MSI is our special library with holdings acquired largely through exchange. The Seaweed and Invertebrate Information Center, which has cataloged practically all known data and information about seaweeds in the Philippines, has been integrated with our library. We are also now trying to catalog some of the commercially important invertebrates. Additionally, we have established an herbarium, which houses a rich collection of seaweeds and seagrasses from all over the country. A reference museum collection of marine fishes and corals is being improved.

FACTORS FOR GROWTH AND ADVANCEMENT

First and foremost, a vision or clear goals set should be set which are understood and generally accepted. For MSI, we decided early on to be the best marine science institution in the country initially, and in South-east Asia within the 20th century. Within this time frame we wanted to be on the same footing as the better institutions in the developed countries.

Good leadership is highly essential in steering any organization in the right direction. But leadership is just one thing—good staff is another. We are lucky to have talented people who are dedicated to their work, determined to achieve high goals, and hungry for fulfillment in their chosen fields. Most of them had been our research assistants and students. My free-and-easy association with them then has proven handy now that they are equal partners in scientific ventures. Having harbored highly dynamic and intelligent people at MSI and staying even-tempered during potentially explosive situations has been beneficial. Jealousy has no room at the Institute—it cripples growth. Instead, we try to share and provide opportunities with and for everybody. We probably have an unspoken understanding that our individual actions determine our collective destiny, thus, everybody is responsible and gives their best.

In addition to the research and teaching that we do on campus or in other parts of the Philippines, we analyze our research data and publish papers in the open literature. We have been fortunate enough to send our research assistants abroad to attend conferences. Usually, it is the senior staff that is off somewhere. The majority of activities they attend are scientific symposia.

Well, I think I should wind down and discuss something I call “limits to growth.” I think we all suffer from budget constraints. The MSI began operating in 1975 with a budget of about P200,000, and after we developed and organized, this went up to about P500,000 from 1976 to 1982 and remained relatively stable. Apparently, MSI suffered from benign neglect by the University during this period, but in 1983 the Philippine Council for Agriculture and Resources Research and De-

velopment went to the Department of Budget and Management and, pointing to our research productivity, asked them to raise our budget by about 1.3 million. It took some help from the outside the university to make that happen.

In 1986 we started to get the Philippine government counterpart to our UNDP project. The increment was because we had the Bolinao facility to develop and expand. After that, increased funding was given in terms of general salary adjustments. The government budget has more or less stabilized from 1988 to the present, with slight increases because of the personnel component.

The greater share of the Institute's budget represents the external funds generated which necessarily show a bit of a fluctuation. But here is where the big funds, including the UNDP project and the regional ASEAN projects, came in. From about 1985 to the present, we have been able to generate substantial external support. I think if we are to average these funds and compare them with the government support (with the possible exception of the infrastructure that has been given to us), for every P1.00 that we get from the University, we bring in P2.00. I am not sure how long we can sustain that, but we'll keep trying. There are some limitations to what we can do because of our budgetary constraints. I wish there were a way to increase the UP support, particularly for operations.

I suppose I do not have to elaborate on some of the constraints in terms of administrative support. We struggle perennially with some of these problems including the support, or the lack thereof, from the Campus Planning and Development Office for some of our infrastructure development. And, invariably, a little bit of politics comes into play which sometimes slows our development and the ability to move forward.

THE FUTURE AT A GLANCE

Finally, let me end with a few words about the future. I think it is important to emphasize the trend towards globalization. Today, we are faced with many programs that are globally significant. Unfortunately, the Philippines is not well-prepared to meet the needs of these global programs. I hope that at MSI we can make our contribution by training people, including some of our staff, to properly respond to these global needs. There are many areas of science that call for international cooperation and, unless you have the right kind of people who are properly trained and have the credibility, it will be difficult for the Philippines to link up with other countries to hold its own in the world community.

This, essentially, brings to an end the points I want to share with you. Don't forget, we got where we are working now under the same conditions as everybody else in the University. We have been fortunate in hav-

ing been able to recruit people who have measured up to our expectations. What is important is that the spirits of cooperation and competitiveness are maintained. It is important that people are supportive of one another. My hope is that from among these 14 faculty members of the MSI, at least half of them will become real racers, and they will have a multiplier effect and bring in resources. At the same time, they will continue to do important and relevant science and train young people that need to be trained, so that MSI can stand in a world community as a proper institution of higher learning.

I think we are now at the vantage point that if everyone does their part, no one will question our position in the field of marine science. Significantly, on December 15, 1994, President Fidel V. Ramos proclaimed MSI a National Center for Excellence. The next goal is for MSI to be the best tropical marine science institution in the world.

REFERENCE

- Gomez, E.D. (1991). Marine science education in the Philippines: Prospects for a program in coastal zone management. In T.-E. Chua (Ed.), *Coastal area management education in the ASEAN region*. Manila, Philippines: International Center for Living Aquatic Resources Management.

EXPERIENCE IN CAPACITY BUILDING: CASE STUDIES AND LESSONS LEARNED

PANELISTS: E. Gomez, S. Boromthanarat, M. Leinen, K. Brown

MODERATOR: S. Cobb

RAPPORTEUR: Segundo Coello

DISCUSSION QUESTIONS

- What are the implications of this stage of institutional and national development?
- What regional differences exist?
- How do we assess institutional needs and capability?

RAPPORTEUR'S REPORT

Edgardo Gomez, Director of the Marine Science Institute (MSI) of the University of the Philippines, presented information based on more than a decade of experience in developing MSI. MSI differs from other departments in that there is a large concentration on research, and it is mostly funded by external sources. He stressed the importance of long-term goal setting, personnel, and funding for capacity building. A major commitment to quality of faculty, staff, and students was a critical component. Long-term goals were necessary to inspire collaborators and provide a sense of team effort. The goal MSI set for itself was to be the best marine science institute in Asia. MSI recruited well-qualified staff for research positions. The best of these were encouraged to study abroad for doctorates. Moral support and making them feel part of the long-term future of the institution led to a 100 percent return of staff studying abroad. The selection of personnel should not promote "inbreeding." On the contrary, MSI has looked for quality staff educated at diverse institutions. MSI has also provided incentives such as allowing scientists to top off their University salaries (which are comparatively low) with honoraria from their grants. Funding has been crucial for MSI, and they encourage scientists to find their own grants for training or research. The external funding to MSI has increased exponentially in recent years.

Somsak Boromthanarat, Director of the Coastal Resources Institute (CORIN) at Prince of Songkla Univer-

sity (PSU), presented his experience. CORIN was established in 1990 as an interdisciplinary institute of PSU. It has a core staff of scientists, dedicated only to coastal management, and an associated staff that are faculty members from different departments of PSU. Capacity building in coastal management at PSU included a strategic planning process, doctoral-level education for staff, and "learning-by-doing" in preparing management plans. CORIN is working in training, research, planning, and policy formulation. Its approach is to "glue" the government and the community together with information. The Institute has attracted significant outside funding, and the funding base is rapidly growing. CORIN also contributes to a recently approved coastal management degree specialization as part of the master's program in Natural Resources Management.

Margaret Leinen, Dean of the Graduate School of Oceanography (GSO) and Vice Provost of Marine Affairs at URI presented an outline of the most important aspects to be considered in capacity building, illustrating her points with examples from her institution:

- A set of well-defined and long-term goals must be established that will serve to attract expertise, resources, and form a local constituency. Several years ago, GSO redefined its goals through a strategic planning process. To share and publicize the goals, the strategic plan was published in a very attractive format.
- Good people are critical to the research and teaching programs at GSO. Having defined goals is important in order to attract quality people. It is also very important to develop a sense of belonging so that everyone feels a part of the institution.

- Infrastructure, the “bricks and mortar,” as well as clerical, fiscal, and maintenance systems of an organization, can be built in different ways. However, she stressed that infrastructure has to serve research and education. Finding funding for infrastructure can be a challenge, particularly in light of the current financial and political climate for public institutions.
- New initiatives, such as the Coastal Institute that is being built at GSO, can be a source of pride and rejuvenation. However, careful planning and coordination are required to get support from the faculty. New initiatives can be important to raise funds for a new infrastructure.
- A set of well-defined goals helps in fund raising. It is very useful to develop mechanisms that link faculty and private companies.

Ken Brown, Professor and Director of the Institute for Coastal Resource Management at the University of Technology Sydney (Australia), presented the structure of the new master's degree in Coastal Resource Management. He pointed out that a key aspect in the development of the program was to identify the real needs. UTS was fortunate to receive a government grant to research the need for, and the requirements of, a coastal management program in Australia. Widespread consultation ensured that a program relevant to the needs of the expected stakeholders was developed. A further major component was the establishment of an advisory board comprised of representative stakeholders. This board meets regularly and acts, in part, as quality control for the subject and the course offerings. The objective of the new curriculum was to train managers who could manage the managers of coastal resources. For the course, academic staff from various units were drawn together. Ken highlighted the need to be very selective and use only those faculty members who can readily contribute to the course. These faculty members could be rewarded with promotion by the challenge of teaching a completely different set of students and by recognized research grants. It was pointed out that this course was developed after extensively researching the need for professionals in coastal management.

During the general discussion it was mentioned that the previous coastal management education programs that have failed in the United States occurred mostly because of communication breakdowns among the different departments contributing to the effort. Harmonious work is essential for the success of integrated coastal management programs. It was also mentioned that the older the University is, the more difficult it may be to introduce changes and new ideas. Therefore, leaders play an important role in facilitating change. In developing countries, it is difficult to retain good staff members because the salaries, incentives, and infra-

structure that universities are able to offer often are poor. To build capacity in an institution, it is necessary to create long-term working teams and a minimum core of people who maintain a long-term effort. In the Philippines, MSI incorporates staff returning from overseas training in ongoing projects. In this way, they have a place to work as soon as they arrive until they can start preparing their own proposals for research funding.

It was also mentioned that some universities in developing countries do not have enough diversity of faculties or departments to support an integrated coastal management program. In such cases, to pool limited resources, some sort of regional cooperative program or center could be useful in an initial phase. However, regional programs have problems due to political and cultural differences between countries and because of the large costs associated with building and maintaining a new institution. One suggestion was that a regional program or center could be a transitory arrangement which would be dismantled once capacity at existing local institutions is established.

The stage of development of coastal management in the region or country also may be important, since this defines the market for graduates of the university. The type or mix of programs offered (training, certificate, undergraduate, or graduate degree) will depend both on the stage of development of the coastal management programs in the country and on the capability (stage of development) of the university.

SECTION 4 NETWORKS AND PARTNERSHIPS

The Network for Environmental Training at Tertiary-Level in Asia and the Pacific (NETTLAP): An Experience in Environmental Networking <i>C.M. Madduma Bandara</i>	119
MEDCOAST Initiative: Contributing to the Environmental Management of Coastal and Sea Areas of the Mediterranean and the Black Sea <i>Erdal Ozhan</i>	123
The TRAIN-SEA-COAST Program: A Decentralized, Cooperative Training Network for the Systematic Development of Human Resources <i>Stella Maris Vallejo</i>	128
The International Ocean Institute Network <i>Margaret J. Wood</i>	133
Rapporteur's Report Networks and Partnerships	141
Rapporteur's Report Donor Initiatives for Building Human Capacity for Integrated Coastal Management	143

THE NETWORK FOR ENVIRONMENTAL TRAINING AT TERTIARY-LEVEL IN ASIA AND THE PACIFIC (NETTLAP): AN EXPERIENCE IN ENVIRONMENTAL NETWORKING

C. M. Madduma Bandara

University of Peradeniya

Kandy, Sri Lanka

ABSTRACT

The Network for Environmental Training at Tertiary Level in Asia and the Pacific, established by the United Nations Environment Program through the Environmental Education Unit and the Regional Office for Asia and the Pacific is described in this paper. The purpose of the network is to strengthen tertiary-level institutions in the region active in environmental education and training to enhance the expertise of decision makers, policy formulators, and educators. Coastal zone management is one of several thematic networks supported by the overall project. The activities, strengths and weaknesses, and future direction of the network are summarized.

NETWORK OBJECTIVES

The coastal environment features prominently in the Asia Pacific Region. Out of the 54 countries within the region, 34 have coastlines. Most Island Nations depend heavily on their coastal resources which entails heavy management responsibilities. The coastal environments of the Asia-Pacific region are also among the most diverse and productive ecosystems of the world. Over half of the world's population lives in the Asia-Pacific region. A high proportion of this populace is concentrated in coastal settlements, most of which are major cities. The increasing trend of increasing concentrations of people in coastal areas, combined with rapid coastal development programs, has resulted in heavy pressures on coastal resources, causing habitat destruction, marine pollution, and increasing the vulnerability of coastal residents and infrastructure to problems caused by coastal erosion.

Agenda 21 of the U.N. Conference on Environment and Development (UNCED) held in Rio de Janeiro in 1992 urged that "countries could support university and other tertiary activities and networks for environmental and development education... There is a need to strengthen, within five years, information exchange by enhancing technologies and capacities necessary to promote environment and development education and public awareness." In the spirit of this resolution,

UNEP supported the establishment of the Network for Environmental Training at Tertiary-Level in Asia and the Pacific (NETTLAP) through its Environmental Education Unit (EETU) and its Regional Office for Asia and the Pacific (ROAP). In the Asia-Pacific region, perhaps more so than in many other parts of the world, the tertiary institutions can take a leading role in coastal zone management education and training. This is particularly so because these institutions continue to be the most important source of expertise in different disciplines and contribute significantly to the generation of scientific information. It is those who graduate from these institutions that hold key management positions in environmental management, which is largely a responsibility of the State. Therefore, the primary objective of the network is to harness the manpower resources available at tertiary institutions to achieve a greater degree of efficiency in coastal zone management in the region.

NETTLAP

NETTLAP consists of institutions and individuals active in environmental education and training at the tertiary level in the Asia-Pacific region. The objectives of NETTLAP include enhancing environmental expertise among the decision makers, policy formulators, and tertiary-level educators. It aims to strengthen the

overall environmental expertise in the region at technical, management, and policy levels. It identifies regional training needs while sharing knowledge through continued interaction among network partners.

The implementation of the network programs is facilitated by several thematic networks: Coastal Zone Management, Environmental Economics, and Toxic Chemicals and Hazardous Waste. In keeping with the consensus of a regional consultative meeting held in 1993, NETTLAP is now considering adding new themes that include Theory and Practice of Environmental Education and Training, Environmental Planning, Environmental Information Management, and International and Regional Legal Environmental Agreements.

The implementation of network programs is organized by a NETTLAP coordinator based in Bangkok. The activities under each of the themes is organized by a Thematic Network Coordinator (TNC) who has the expertise in the relevant field. In view of the large geographical area covered by the Asia-Pacific region comprised of 54 nations, subregional Thematic Network Nodes (TNN) with a proven academic record in the respective field are identified and entrusted with relevant tasks. In order to facilitate the management of the respective programs, specialist focal points, such as government ministries, departments, or corporations, are identified and the NETTLAP activities are often channeled through them. The TNCs and TNNs often work through these agencies.

The tasks and responsibilities of a TNN/CZM includes participation in coordination meetings, identifying additional NETTLAP members, preparation of an inventory of environmental education and training activities in CZM at tertiary level in the region, determining additional training requirements of tertiary institutions, hosting subregional resource development workshops, contributing material to NETTLAP news, and identifying appropriate participants and resource persons for network workshops and other activities. The TNNs are also expected to help prepare of curriculum guidelines, training materials and instructional aids, and contribute to the general activities of NETTLAP. These responsibilities are discharged by TNNs in collaboration with the Network and Thematic Network Coordinators.

STRENGTHS AND WEAKNESSES OF NETTLAP

The increasing concern for environmental training among national governments as well as in tertiary institutions and among the general public in the region, provides a source of strength to NETTLAP programs. Compared with the situation a decade or two ago, environmental management is now treated as a matter of vital relevance in development planning. The implementation strategies adopted by NETTLAP with regional as well as thematic approaches also provide

strength and sustainability. Above all, the supportive structure based on UNEP and ROAP led to the development of strong international linkages. The track record of success of NETTLAP within a short period as exemplified by newsletters and numerous publications indicate the strength of the network.

On the weaker side of the network, one may identify a certain degree of vulnerability in its activities. NETTLAP is a small organization attempting to satisfy a need which is too big for its size. This had led to a perception of a "little fish in a big pond". On the other hand, it has the advantage of reaching places where the big "fish" cannot. Up to now, NETTLAP has had to adopt a "top down" approach in planning its activities. This was necessary in its early stages. The activities of the network were also confined to staff training primarily in tertiary institutions, a focus too narrow for the field of environmental training. Despite the growing concern for environmental education, the lack of strong political will and support at the regional level tends to make the future of the network somewhat uncertain. This is largely due to the preoccupation of most countries in the Asia Pacific with their immediate development needs. This is understandable in view of the problems of overriding importance such as poverty and unemployment. NETTLAP also has to face more competition than collaboration both within the UNEP and outside, often due to areas overlapping activities. The threat that funding can be withdrawn from UNEP always hangs above NETTLAP. Finally, the overly successful program of the network tends to suffer from the "tall poppy" syndrome which creates flexibility problems.

A challenge faced by NETTLAP and similar networks in the field of environment management is how they will be sustained over a reasonable period of time. If one looks at the life span of similar networks, it may become clear that generally, they are short-lived. The secret of more enduring networks, particularly in developing countries, has been the long-term commitment of resources by funding agencies, rather than the sheer interest and enthusiasm of their initiating groups. Some of the more successful networks tend to grow into more stable organizations depending on their demand. In this context, it would also be appropriate to perceive networks as "birds of passage", only paving the way to achieve some specific goal within a given period of time.

RESOURCES DEVELOPMENT WORKSHOPS (RDW)

It is through the concept of the Resources Development Workshops (RDW) that NETTLAP has adopted a somewhat innovative approach in achieving a multiplier effect in its training activities. In order to illustrate this approach and its potential for further development, an attempt is made here to discuss the

outputs and evaluate the training and resources development workshop on coastal zone management held in Kandy, Sri Lanka, toward the end of November 1994. Sri Lanka was chosen to host this workshop because it is centrally located within the region, and it has made rapid progress in coastal zone management during the last decade particularly through external assistance from Denmark, Germany, Japan, the United States, and The Netherlands.

An RDW was held in Kandy for about 20 people from countries in Southern and Central Asia including Sri Lanka. The primary goals were to prepare curriculum guide lines, training materials, instructional aids, and resources. The Centre for Environmental Studies at the University of Peradeniya, Kandy, Sri Lanka was the site chosen for the conference and where TNN was located. Although Kandy is not a coastal city, it is near the largest university in the country where there is much potential for integrated coastal zone management education.

The workshop program, in addition to the inaugural and introductory sessions, concentrated on four topics. Participants presented papers that addressed these subjects:

- Role of Tertiary Institutions in Training for Coastal Zone Management.
- Issues and Challenges for Trainers in Coastal Zone Management
- National and Sub-Regional Experiences of Training in Coastal Zone Management
- Training Methods for Coastal Zone Management

Each topic was introduced by a keynote speaker with experience in the field who gave a lecture on a related theme. The presentations ranged from country-specific experiences to highly specialized aspects of coastal ecosystems and specific training methodologies.

The most positive aspect of the workshop was that it enabled a truly interdisciplinary and international group of academics and actual practitioners in the field of coastal zone management to be brought together. It was quite fascinating to observe the different approaches and emphases on CZM displayed by participants from India, Pakistan, and Bangladesh depending on their specific country requirements. India, in particular, has a large land mass with a long coast line and a wide range of coastal ecosystems which need very different management treatments. India, therefore, has a wide array of training needs. Sri Lanka, on the other hand, is an Island Nation and has a long coastline for its size with a variety of coastal environments where problems of coastal erosion tend to stand out in relation to other issues. The dialogue would have been much more enriched if other countries in the region,

such as the Maldives, Iran, and Afghanistan, could also have participated in the meeting.

The convergence of people from a variety of academic and professional backgrounds led to lively debates generated largely by different perceptions of the same issues. Very often even people from the same institution, if they belong to different faculties, find few opportunities to meet and discuss such issues. One common message that surfaced from these discussions is the need for innovative approaches rather than depending on traditional discipline-bound training methods. The "role play" approach, as well as participatory field mapping, appears to have had good potential in this regard. It was remarked that a trainee who does not like to get suntanned in the tropical sun can make a good manager!

The discussions also established the validity of the criticism that the current preoccupation with technological and biophysical approaches rather than social and economic aspects results in poorly integrated management of coastal resources. In most countries, the engineer and the ecologist were drawn into coastal zone management rather than people from other disciplines due to historical as well as practical reasons. There is a need to redress these imbalances in order to achieve better results in coastal zone management. This also provides the rationale for the development of an integrated "core curriculum", at least at undergraduate level, while leaving more specialized training to postgraduate and in-service training programs.

CZM EDUCATION AND TRAINING IN THE ASIA-PACIFIC REGION

An ESCAP study (1985) indicated that many CZM courses in tertiary institutions were being taught from a traditional discipline base rather than in an interdisciplinary academic environment. Similarly, at an ASEAN-USAID Workshop on CZM Education in the ASEAN region (Chua, 1990), it was agreed that trained manpower in integrated CZM is not adequately provided by educational institutions in the region. A more comprehensive assessment of issues related to CZM in the Asia-Pacific region is given by Hay et al (1994) and by Chou (1994). These assessments indicate that the greatest need at present is the provision of facilities at the tertiary level for integrated coastal zone management training. This may be best achieved, not through the discipline-based faculties and departments, but through the interdisciplinary centers for environmental studies which are emerging in some universities.

It could also be observed that most tertiary institutions in the region are largely involved in CZM "education" rather than "training" since education is their primary mission. Here, although one need not get involved too much with the semantics of definitions, education is a much more involved activity that refines

the powers of observation and reasoning than does training for a specific task. Needless to say, even most higher order animals can be trained, but they cannot be educated. CZM managers needed in the times to come will have to be people with leadership qualities and problem-solving attributes. Therefore, it could be argued that our approach should be to develop curricula and teaching methods based on realities and problems in each society rather than highly universal approaches.

THE FUTURE OF THE NETTLAP

The continuity of NETTLAP depends largely on the support from UNEP and its policy regarding financial commitments for the future. There is a great need to make NETTLAP financially self-sustaining. Assuming that it becomes self sustaining through UNEP or by other means, NETTLAP will go ahead with its program of decentralization to subregions and even to the national level. This would become necessary in view of the large geographical area as well as the large population it has to serve.

The focus of NETTLAP, which remained somewhat narrow up to now, is likely to expand by incorporating more topics such as environmental planning, environmental information management, and environmental impact assessment of coastal projects. It will also expand its target groups from tertiary institutions to decision makers in the government, industry, and coastal communities. It will strive to bring about a greater degree of coordination among environmental education and training efforts both internationally and nationally through specialist focal points to avoid any wasteful duplication.

In its programs of education and training, NETTLAP will promote the innovative application of information technology through the use of Internet and data bases. Since networking is essentially an interpersonal, inter-institutional, and international linkage process, it is thought that promotion of information technology would become a fertile area for bilateral cooperation and assistance. Finally, NETTLAP should ideally develop a long-term strategic plan in consultation with its members and partners, and evolve a management system which would improve its performance.

REFERENCES

- Chou, L.M. (1994, November-December). The role of tertiary institutions in integrated coastal zone management training. Paper presented at the UNEP/NETTLAP Training and Resources Development Workshop in Coastal Zone Management, Kandy, Sri Lanka.
- Chua, T.E. (Ed.) (1991). *Coastal area management education in the ASEAN Region*. Manila, Philippines: International Center for Living Aquatic Resources Management.
- United Nations, Economic and Social Commission for Asia and the Pacific. Training and fellowship requirements and facilities in the field of marine environment protection in the ESCAP region. Bangkok: The Commission.
- Hay, J.E., Chou, L.M., Sharp, B. & Thom, N.G. (1994). Environmental and related issues in the Asia Pacific region: Implications for tertiary level environmental training. UNEP/ROAP, Bangkok: Network for Environmental Training at Tertiary Level in Asia and Pacific.
- UNEP/NETTLAP: Miscellaneous unpublished papers.

MEDCOAST INITIATIVE: CONTRIBUTING TO THE ENVIRONMENTAL MANAGEMENT OF COASTAL AND SEA AREAS OF THE MEDITERRANEAN AND THE BLACK SEA

Erdal Özhan

Medcoast Permanent Secretariat
Middle East Technical University
Ankara, Turkey

ABSTRACT

MEDCOAST is a network initiative aiming at contributing to the environmental health of the Mediterranean and Black Sea in three ways. These are 1) the MEDCOAST conferences, 2) human resource development programs, and 3) collaborative research. These three dimensions complement the priorities and programs of the Mediterranean Action Plan which is being developed in accordance with the principles of UNCED (e.g., Agenda 21) and the GEF Black Sea Environmental Programme. The MEDCOAST Initiative can provide needed scientific and professional support to national and international politics.

BACKGROUND

Great numbers of coastal and sea areas of the world are beset by serious problems, resulting from rapid development, improper use patterns, and insufficient protection. For this reason, proper coastal and sea management that aims to achieve sustainable uses of coastal and sea resources and their protection, has been on the top of the world's environmental agenda for the last two decades.

The Mediterranean basin, including the Black Sea, is one of the major seas where rational management of coastal and sea resources, incorporating a high level of protection and regeneration in certain cases, is strongly needed. This need was realized by the United Nations following the Stockholm Conference in 1972. The Mediterranean Action Plan and follow-up activities were launched as the first project in their new Regional Seas Programme.

Today, however, after almost two decades of intense interest by a number of prominent international organizations, the level of international networking and collaboration in solving environmental problems in coastal and sea areas of the Mediterranean is far from sufficient.

On the other hand, the Black Sea was not included in the Mediterranean Action Plan. This unique en-

closed basin, an extremely important common resource for six riparian countries, has seen a drastic decline in resource value since the 1950s. This decline has accelerated during the last two decades, most notably in water quality and fisheries, and in the environmental conditions of important natural coastal habitats. As a response to the crisis, significant international efforts (the GEF Black Sea Environmental Programme, the Black Sea Action Plan) have emerged recently to turn the tide.

The idea to start the MEDCOAST initiative, focusing on coastal and sea issues of the Mediterranean and the Black Sea, began in July 1990 during the Littoral 1990 conference organized by the EUROCOAST Association. The project was discussed with colleagues internationally. It was noted that although there were significant concerns about the environmental well-being of the Mediterranean and the Black Sea, and that serious efforts had been made by international organizations, national authorities, and NGO's to preserve the environment and the sustainability of resources, the level of international scientific cooperation and the benefits of experiences of different nations were far from satisfactory. It was concluded that a) there was an immediate need for an international conference series open to all interested, b) it would be beneficial to improve the

exchange of information and know-how by establishing a network of professional and scientific centers around the Mediterranean basin and elsewhere where there is an interest in the coastal and sea environment of the Mediterranean/Black Sea, and c) it would be very valuable to develop international education programs focusing on the coastal and sea environment and management issues of the Mediterranean and the Black Sea.

THE GOAL

The MEDCOAST Initiative has three components—a MEDCOAST conference series; human resource development (conferences, training programs, networking); and collaborative research. The goal of the initiative is to enhance scientific and professional collaboration among individuals and institutes (networking) in the Mediterranean and the Black Sea countries or elsewhere for the purposes of:

- Improving our understanding of physical, biochemical, and ecological processes taking place in the Mediterranean and the Black Sea coastal and sea environment and their interactions with human activities (research component)
- Utilizing scientific knowledge and modern management tools in achieving integrated coastal and sea management (conferences, training programs, publications, newsletter)
- Complementing and contributing to the existing efforts that have similar goals, most notably those of the Mediterranean Action Plan, the GEF Black Sea Environmental Programme, and the future Black Sea Action Plan (all components)

MEDCOAST CONFERENCE SERIES

The MEDCOAST conferences were planned as an internationally administered conference series focusing on the conservation and sustainable use of coastal and sea resources of the Mediterranean and the Black Sea. In fact, the MEDCOAST Initiative was launched with the First International Conference on the Mediterranean Coastal Environment, MEDCOAST 93, which took place in Antalya (Turkey) November 2-5, 1993. The conference was organized jointly by the Turkish National Committee on Coastal Zone Management (KAY) and Middle East Technical University. It was sponsored by 16 international and Turkish organizations including the Council of Europe, UNEP Mediterranean Action Plan, UNDP, the International Coastal and Ocean Organization (ICO), the Association EUROCOAST, and the European Union for Coastal Conservation (EUCC).

The conference topics, which were broad enough to cover almost all relevant issues, were presented in three groups: 1) physical, ecological, and conservation issues, 2) integrated coastal and sea resource management and

development, and 3) coastal engineering, modelling and data management. About 120 abstracts were selected for oral and poster presentations, and a significant number of proposals had to be rejected due to program limitations. About 90 papers were received before deadline to be included in the conference proceedings (two volumes). Thirteen papers selected from the proceedings are being peer reviewed and may be included in the special double volume, *Mediterranean Issue of the Journal of Coastal and Ocean Management*. This special issue is expected to be printed before the meeting of MEDCOAST 95.

MEDCOAST 93 was a lively and stimulating meeting. 140 professionals from 26 countries, representing various disciplines and affiliations, participated in the conference. It demonstrated that the new conference series was indeed very timely and much needed. An International Committee and a Permanent Secretariat for MEDCOAST conferences was set up to look after future conferences.

The next conference, MEDCOAST 95, organized jointly by the MEDCOAST Permanent Secretariat and the Local Organizing Committee (led by the Maritime Engineering Laboratory of Catalanian University of Technology), is scheduled to take place in Tarragona, Spain, October 24-27, 1995. Tarragona, an ancient Mediterranean town near Barcelona, was chosen in recognition of the 20th anniversary of the Barcelona Convention. It is anticipated that around 150 papers dealing with coastal and sea environments of the Mediterranean and the Black Sea and various management issues will be presented at MEDCOAST 95 in three or four parallel sessions, in addition to plenary and concluding sessions and panel discussions.

One of the major goals of the MEDCOAST conference is to bring together a wide variety of experts, scientists, managers, planners, policy makers, resource developers, users, and conservationists from both Mediterranean and Black Sea countries and elsewhere who have been directly involved in coastal and sea management issues in the Mediterranean and the Black Sea or who have acquired experience and knowledge elsewhere on matters that are relevant to the Mediterranean and the Black Sea. The range of topics covered is rather large including highly scientific subjects such as various disciplines of oceanography, on one hand, and managerial issues including institutional and legal arrangements for proper management or specific management experiences, on the other.

The MEDCOAST conferences will convene every two years (in odd-numbered years) in a different Mediterranean or Black Sea location. The MEDCOAST Permanent Secretariat assumes scientific responsibility for all conferences including conference topics, organization of the paper selection process, editing the proceedings, and publication of selected papers in the refereed me-

dia. The Secretariat also carries out promotional work at the international level. In addition to finding international donors to sponsor conferences, the Secretariat handles design, printing, and mailing of promotional publications (Call for Papers, bulletins, conference programs, or posters) and arranges to have conference information printed in the international media (journals, newsletters, bulletins).

HUMAN RESOURCE DEVELOPMENT

In addition to the international efforts aimed at environmental management of the Mediterranean and the Black Sea mentioned earlier, various riparian countries have already started, or are about to start, their integrated coastal zone management programs. Therefore, there is a great need for expertise in governmental agencies both for design and implementation of national management projects and for contribution to the international programs.

The most important human resource development activity carried out in the framework of the MEDCOAST initiative is the MEDCOAST Institute. This training program is handled collaboratively by member institutions of the Network MEDCOAST, under the leadership of the MEDCOAST Permanent Secretariat at the Middle East Technical University (Ankara, Turkey) with sponsorship of the Med-Campus Programme of the European Communities. The 10 institutions that are members of the Network MEDCOAST (as of January 1995) and names of the point persons, are given in Annex 1.

The MEDCOAST Institute offers a three to four week intensive training program entitled Coastal Zone Management in the Mediterranean / Black Sea. The curriculum is comprised of extensive in-class training, a field trip, and a concluding workshop. It is designed to address issues and problems that are particular to or significant to the Mediterranean and the Black Sea. With this regional emphasis, the MEDCOAST Institute differs from other programs that are available for international participation.

The first institute (MEDCOAST Institute 94) was held in Ankara and Bodrum from August 22 - September 14, 1994. There were 25 qualified professionals from 16 countries who participated. The Institute's faculty included seven internationally known experts from five countries and a guest lecturer from the Mediterranean Action Plan Coordinating Unit. MEDCOAST Institute 94 is described in detail in Özhan and Çulhaoglu (1995). The next event, MEDCOAST Institute 95, is scheduled to take place in Ankara and Marmaris August 28 - September 15, 1995. In addition to the Med-Campus Program of the European Communities, the GEF Black Sea Environmental Programme Coordinating Unit (Istanbul, Turkey) has already agreed to sponsor the participation of the professionals

from the Black Sea countries at the MEDCOAST Institute 95. A condensed version of the in-class training part of the MEDCOAST Institute 95 will be offered as a two-day short course October 22-23, 1995 in Tarragona, Spain, prior to the MEDCOAST 95 conference.

Additionally, the Network MEDCOAST is organizing more specialized, thematic training programs relevant to coastal and sea management. The first example is the International Workshop/Training Program on Beach Management in the Mediterranean/Black Sea, to be held in Erice, Sicily, April 7 - 12, 1995. In addition to the MEDCOAST Permanent Secretariat and the Network MEDCOAST, two major sponsors for this training activity are the ICSC-World Laboratory (Land-3 Project) in Erice, Italy and Lausanne, Switzerland, and the European Center on Insular Coastal Dynamics in Valetta, Malta. The lecturers who will contribute to this program include 13 well known experts from 11 countries.

The Network MEDCOAST plans to publish a biannual MEDCOAST Newsletter starting in April 1995 sponsored by the Med-Campus Program of the EC. The newsletter will disseminate information on MEDCOAST activities, news on progress of the international programs over the Mediterranean and the Black Sea, reports on activities of the riparian countries relevant to coastal and sea management, and short technical reports on new ideas and initiatives and recent developments.

Another goal of the project sponsored by the Med-Campus Program of the EC is the development of a graduate program on coastal zone management at the Middle East Technical University. This program, which will be conducted in English, is in the development stages.

This interdisciplinary graduate program aims to educate teachers and qualified professionals who have different undergraduate backgrounds and who wish to develop expertise relevant to rational use and protection of coastal and sea resources. The undergraduate degrees of students eligible for admission to coastal zone management graduate program may be from diverse areas, ranging from natural sciences (chemistry, biology, ecology, geomorphology) and engineering (civil, environmental) to law (environmental, international) and social sciences (resource economics and management, land use planning, and sociology).

The graduate program, which will be run by an interdisciplinary faculty of Middle East Technical University with the support of the partner institutions involved in the Network MEDCOAST, started initially as a master's program. The program is now developed within the scope of the Med-Campus project, and the first intake of students to the program began in the fall of the 1994-95 academic year.

The student body of Middle East Technical Univer-

sity is very international—about 35 countries are represented. The coastal zone management graduate program will also be available for students from different countries, but preference will be given to those coming from the Mediterranean and the Black Sea riparian countries.

The minimum, average, and maximum durations of a master's program at Middle East Technical University are two, four, and six academic semesters respectively. These minimum and maximum durations will also apply to the new program. The average duration of study is also expected to be around four semesters (two years). About 500 total teaching hours are expected to be completed each year, corresponding to 10 courses (five courses per semester).

Typical courses in the graduate program will be:

- Coastal and marine sciences (oceanography courses; coastal and marine chemistry, biology, ecology; coastal geomorphology)
- Engineering (coastal engineering, coastal pollution control, coastal sedimentation and shoreline management, environmental impact assessment of coastal projects);
- Coastal and sea resources (living resources, non-living resources, special areas)
- Coastal and sea development (tourism, transportation, fisheries, urbanization, industry)
- Management of coastal and sea resources (land-use planning, resource economics, institutional arrangements for management, management of specially protected areas, national and international legislation, international policies and programs)

It is anticipated that a few years after the beginning of the master's program, the capacity that will have been built up and the experience gained will be sufficient for the start of the doctoral program. This program will produce young academicians in the field.

COLLABORATIVE RESEARCH

The third dimension of the MEDCOAST initiative is collaborative research among the network institutions in cooperation with third parties on the coastal and sea environment of the Mediterranean and the Black Sea and management issues.

Two research projects are already in progress. One of these is a study on the priorities of beach users. The goal is to achieve a rational beach rating scheme in which a comprehensive list of parameters are considered together with the level of importance given to each by the users. Such a scheme will no doubt provide a very valuable guideline to beach managers. Middle East Technical University (Turkey), University of

Glamorgan (Wales, UK), and Catalanian University of Technology (Spain) are partners in this project. In addition to these universities, the British Council and the Welsh Office sponsor the project activities.

The second project is wind and wave climatology of the Black Sea and the Eastern Mediterranean. It involves measurement and analysis of wind waves, wind and wave modelling, and statistical interpretation of wind and wave data. One of the goals is to construct a reliable wind and wave atlas (both in the form of a publication and a PC data base). The other is to develop a wind wave model, verified by wave measurements, which may be used reliably for future wave prediction. This comprehensive project is led by the Middle East Technical University. Four oceanographic institutions from four Black Sea countries contribute to the Black Sea component. This component is sponsored by the Science for Stability Program of NATO.

The Middle East Technical University is cooperating with the ICS-World Laboratory (the LAND-3 Project) to develop the Eastern Mediterranean component of the wind and wave climate project. At a later stage, research organizations from a number of riparian countries are expected to contribute.

A major target of the research component of the MEDCOAST Initiative is to set up a coastal monitoring network of nongovernmental institutions from the riparian countries of the Mediterranean and the Black Sea and a data management center. This challenging project requires a significant level of international sponsorship.

CONCLUDING REMARKS

The MEDCOAST Initiative has gone a long way in a relatively short time since its initiation through the efforts of many colleagues and various national and international organizations. The MEDCOAST conference series has been well received by the international community, which has an interest in the environmental well-being of the coastal and sea areas of the Mediterranean and the Black Sea. With the second event, MEDCOAST 95, the series will have established itself sufficiently for successful continuation in the future.

The three to four week training program (MEDCOAST Institute) and the graduate program on coastal zone management in the Mediterranean and the Black Sea provide valuable opportunities to train professionals from the riparian countries and for an international group of experts to observe the progress of the international and national efforts for coastal and sea management. These activities will be sponsored by the European Communities through their Med-Campus program during 1995, and probably during 1996. However, successful continuation and further development of these activities (especially the MEDCOAST Institute) require more definite, continuous financial support and

a stronger institutionalization as a regional Center of Excellence serving the Mediterranean and the Black Sea countries.

All three dimensions of the MEDCOAST project complement the priorities and programs of the Mediterranean Action Plan that are being developed along the principles of the UNCED (e.g., Agenda 21) and the GEF Black Sea Environmental Programme. If platforms for valuable mutual interactions can be established, the MEDCOAST Initiative and Network MEDCOAST, with activities in all three components, have the capacity to make significant contributions to these important efforts by providing much needed scientific and professional support to national and international politics.

REFERENCE

Özhan, E. & Çulhaoglu, E.B. (in press). "MEDCOAST Institute: A Training Program on Coastal Zone Management in the Mediterranean/Black Sea", In Proceedings of the *Workshop on Educating Coastal Managers, 5-10 July 1995*. Narragansett: Coastal Resources Center, The University of Rhode Island.

ANNEX 1

Member institutions of the Network MEDCOAST and the contact persons:

(January 1995)

1. Middle East Technical University, Ankara, Turkey.
(Prof. Erdal Özhan, The Coordinator)
2. University of Genoa, Italy. (Prof. Adalberto Vallega)
3. University of Glamorgan, Wales, U.K.
(Prof. Allan Williams)
4. University of Amsterdam, The Netherlands.
(Dr. Frank van der Meulen)
5. Delft Hydraulics, The Netherlands.
(Mr. Jentje van der Weide)
6. International Center for Coastal & Ocean Policy Studies (ICCOPS), Genoa, Italy.
(Prof. Adalberto Vallega)
7. Turkish National Committee on coastal Zone Management (KAY), Ankara, Turkey.
(Prof. Erdal Özhan)
8. Catalanian University of Technology, Barcelona, Spain. (Prof. Agustin, Sanchez-Arcilla)
9. University of Malta, Valetta, Malta.
(Mr. Anton Micallef)
10. Israel Institute of Technology (TECHNION), Haifa, Israel. (Prof. Michael Stiassnie)

Note: The first seven institutions are the founding members.

THE TRAIN-SEA-COAST PROGRAM: A DECENTRALIZED, COOPERATIVE TRAINING NETWORK FOR THE SYSTEMATIC DEVELOPMENT OF HUMAN RESOURCES

Stella Maris Vallejo

Office of Legal Affairs

United Nations

New York, NY, U.S.A.

ABSTRACT

This paper discusses the main features of the TRAIN-SEA-COAST Program by comparing traditional approaches to human resources development and the TRAIN-X approach. Then it presents a summary of activities within the TRAIN-SEA-COAST Program.

INTRODUCTION

Capacity building involves human resource development. It involves developing organizations and promoting an overall policy environment that is conducive to generating appropriate responses to core national objectives for the sustainable development of coastal and marine areas. More than 20 years of experience in training and education in coastal and ocean management have rendered highly relevant lessons that can provide new directions for future activities.

A variety of formal and nonformal training programs have been developed to cope with the increasing demands of the maritime sector (coastal and ocean components). These training programs are delivered in conjunction with technical assistance programs, university programs, and research programs by international, governmental, or nongovernmental organizations.

However, a number of gaps and limitations have been identified in the current offerings, in particular, the ad hoc response to human resources development (HRD) that has been undertaken with myriad uncoordinated efforts and have led to duplication, limited impact upon the target population, and limited cost effectiveness. Therefore, it is timely to identify more coherent strategies and instruments for HRD that better respond to the needs of developing countries and have a long-term impact and attain sustainable efforts.

The TRAIN-SEA-COAST Programme is the primary instrument used by the United Nations Division for Ocean Affairs and the Law of the Sea (UN/DOALOS) to build national capabilities for HRD in the field of

coastal and ocean management. The TRAIN-X approach is the strategy which has been used for 15 years by a number of UN agencies. The TRAIN-X strategy is based on cooperative training and HRD networks for the development and sharing of high-quality course materials. Meeting the rigorous requirements of the TRAIN-X course development methodology can lead to broad improvements in training centers and their associated policies and programs. In this way, TRAIN-X can be used to spearhead broader HRD improvements.

Programs (see Fig. 1) already established are CODEVTEL/ITU (telecommunications); TRAINMAR/UNCTAD (maritime transport); TRAINAIR/ICAO (civil aviation); TRAINFORTRADE/UNCTAD (foreign trade).

This paper discusses the main features of the TRAIN-SEA-COAST Programme by comparing traditional approaches to human resources development versus the TRAIN-X approach. Then it presents a summary of current activities within the TRAIN-SEA-COAST Programme.

APPROACHES TO HUMAN RESOURCES DEVELOPMENT: THE TRADITIONAL APPROACH VERSUS THE TRAIN-X APPROACH

There are 10 major points affecting the process of capacity building, in particular, the development of human resources (HRD) (see Fig. 2). This paper compares the traditional approach to training with the TRAIN-X method. (To stress the elements of TRAIN-X, I have somewhat exaggerated the limitations of the traditional methods.)

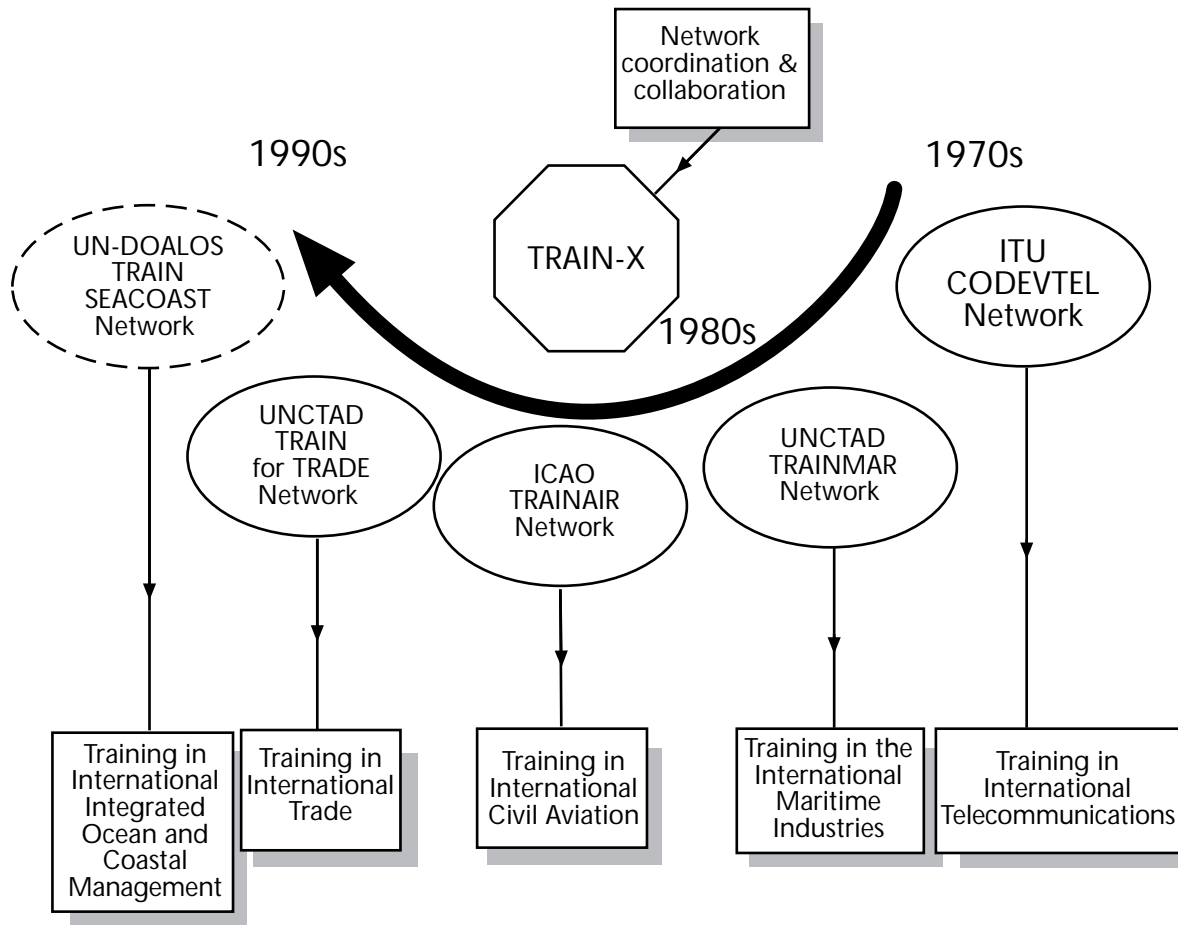


Figure 1. Historical development of UN networks.

Determination of HRD Priorities. Traditional approaches to HRD have not been based on accurate or effective data on manpower requirements and training needs to meet anticipated developments in integrated coastal zone management (ICZM) and ocean management (OM). This impinges on the definition of priority training needs and in measuring the impact and progress achieved by HRD in past decades.

The TRAIN-X approach to HRD is based on a clear definition of human resources that are necessary to meet the emerging demands for manpower. This definition is based on an assessment of the existing level of manpower skills as well as looking ahead to the skills that will be needed in the future as new technology and procedures appear on the horizon. This is followed by an evaluation of the training and nontraining needs of those involved in ICM and OM—the number of people in each job category and function to be trained in different subjects over time—as well as the performance the training is supposed to improve.

Training Strategy. Traditional approaches to HRD are characterized by a one-to-one partnership between

educational institutions (generally universities) or between international organizations working together with a training/educational institution or an NGO. The result is a myriad of individualized, uncoordinated HRD efforts that leads to duplication or overlap, limited impact on the target population, and limited cost effectiveness.

The TRAIN-X approach to HRD is based on the creation of intercountry cooperative training and HRD networks of training/educational centers that agree to join the global network and share the training development task according to demands on training and its related costs. Joint discussion and consensus at the network level regarding priority courses avoids duplication, multiplies the impact, and increases cost-effectiveness. Furthermore, cooperation in sharing training tasks allows each training center to concentrate on its chosen priority subject, avoiding the traditional dilution of quality which results from trying to do everything with limited resources.

Methodology of Course Design. Traditional approaches to HRD have followed a number of training methodologies depending on the experience, expertise,

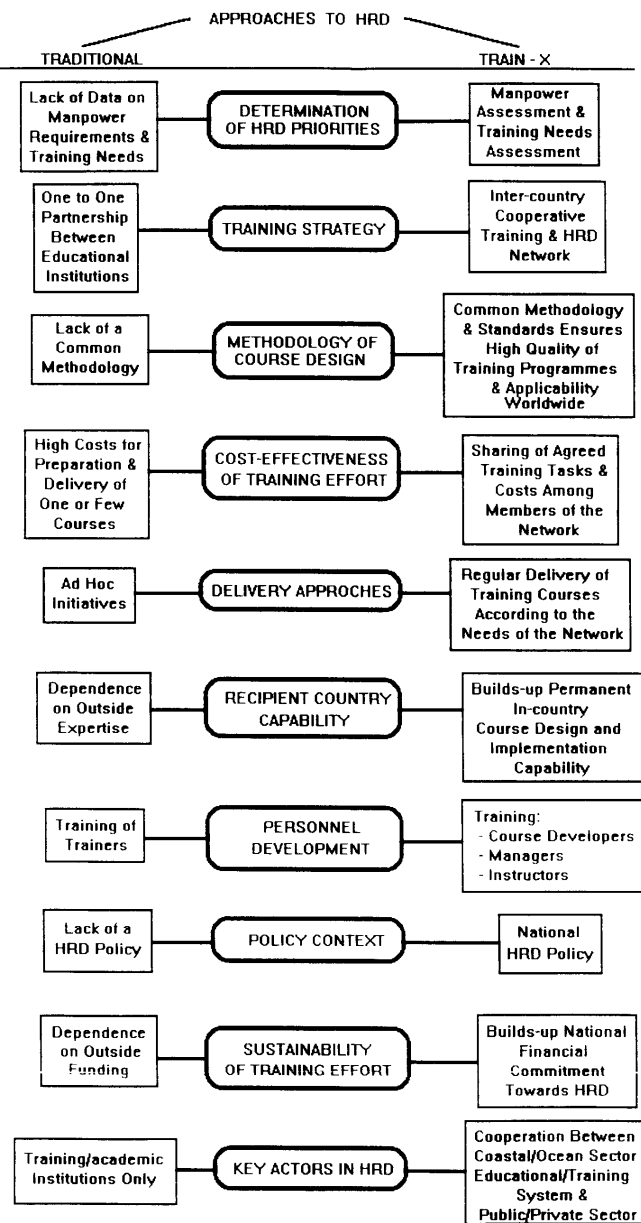


Figure 2. A comparison between the traditional approach to HRD and the TRAIN-X method.

and approach or philosophy of the particular institution that is delivering the training.

The TRAIN-X approach to HRD is based on a common set of standards, both in the methodology of course design and in the presentation of training materials that are applied throughout the network of training centers. It is intended as a tool for international cooperation in training development. Trainee material and instructor material are fully documented. This helps to ensure high-quality training and its application worldwide.

Cost Effectiveness of the Training Effort. Traditional approaches to HRD involves high costs for the prepara-

tion and delivery of one or a few courses that often reach only a limited audience. This has proven to be an inappropriate and ineffective way to tackle the HRD needs in developing countries.

The TRAIN-X approach to HRD is based on cooperation and sharing among the members of the network and agreed-upon course development tasks and up-front costs involved in the preparation of high-quality training materials. The courses are freely exchanged between the members of the network and locally adapted only when justified. In terms of the multiplier effect, the cost-effectiveness is enormous.

Delivery Approaches. Traditional approaches to HRD involve ad hoc initiatives without the support of an overall assessment of training needs at the local or national level or a clear definition of what performance the training is supposed to target and improve. International subject matter experts are brought in and they prepare and deliver their own lectures based on their experience and expertise. The quality of training depends on the individual instructor. Training materials are not systematically prepared or updated.

The TRAIN-X approach to HRD consists of initiatives orchestrated at the national level based on a detailed evaluation of training needs and anticipated performance. The approach depends on the regular delivery of training courses that have been identified as priority topics for the network, thus having a wide impact on the target population. The quality of training depends on the rigorous preparation of advanced, high-quality course material to TRAIN-SEA-COAST standards in the form of Standardized Training Packages (STPs). This approach produces very complete materials for the instructor making the courses largely instructor-independent and avoiding the crucial problem, in many countries, of losing training capability because of a rapidly changing instructor population. It also allows for maximum utilization, exchange, and distribution of high-quality training courses and materials worldwide, thus having a multiplier effect.

Recipient Country Capability. Traditional approaches to HRD depend on outside expertise. In this context, the quality of training is based on transplanted experiences from abroad. The resulting courses may not tackle the specific needs at the local level or provide ongoing capability to the recipient institution. Furthermore, once a course is developed, it is never revised unless external funds are available to do it and the local problems are assessed and dealt with by external parties.

The TRAIN-X approach to HRD is based on the principle of building national training capabilities. Membership in the TRAIN-SEA-COAST Program enables countries to develop advanced and high-quality training courses in coastal and ocean management. This is achieved by providing member countries with the

most advanced technical knowledge and tools in the field of training and building up permanent course design and implementation capability. The systematic training of course developers gives them the ability to develop their own curricula. Furthermore, the course development methodology has a built-in capability to adapt to change through the method of revision (update, adapt, or upgrade). The network copes by having local centers constantly addressing local problems and, on a regional or interregional basis, agreeing to do something about them.

Personnel Development. Traditional approaches to HRD involves training of trainers. This training is generally coupled with curricula prepared by international experts. This is then given to national institutions to use as a basis for lesson plans devised by a local instructor. This leaves the recipient country dependent on imported curricula that may not address local/national needs.

The TRAIN-X approach to HRD is based on the systematic training of course developers, managers, and instructors in order to improve their competence, professionalism, and effectiveness as well as drawing from their own human resources and experience to address HRD needs. Furthermore, the functions of course developers, managers, and instructors within the TRAIN-SEA-COAST network are intended to be recognized as a distinct category of service within the organizational structure where the TRAIN-SEA-COAST centers are located.

Policy Context. Traditional approaches to HRD have not aimed to create an HRD policy in the field of ICM and OM.

The TRAIN-X approach to HRD aims at the definition and implementation of a HRD policy based on the number and type of personnel within an institution that require training and the training needs based on national or local priorities. The assessment of the manpower and associated training needs outline the logistical framework that identifies the financial, human, technical, and institutional resources needed to carry out the training.

Sustainability of the Training Effort. Traditional approaches to HRD involve, to a great extent, the provision of outside funding to prepare and implement training courses.

The TRAIN-X approach to HRD aims to build a national financial commitment to HRD. At the national level, training institutions may obtain the collaboration of the government and the private sector to share the financing of the development of priority courses. At the international level, costs are spread over a much larger target group and recovered through the exchange of training materials, instructors, and information.

Key Players in HRD. Traditional approaches to HRD involve, almost exclusively, participation of educational/training institutions with limited involvement of government and users/ beneficiaries in the design and implementation of training programs. This eliminates the crucial feedback from the consumers of training and makes training unresponsive to the needs of the labor market.

The TRAIN-X approach to HRD aims to strengthen the links between the coastal/ocean sector, the educational/training system, and the public/private sector. This is achieved through collaboration, within each TRAIN-SEA-COAST center, of course developers (who are pedagogic experts) together with subject matter experts that may be recruited from the private/public sector, academia, or industry depending on his or her particular expertise. This collaborative approach to training stimulates dialogue and consensus building. A participatory strategy to HRD leads to a shared vision of needs and opportunities and creates a solid foundation to formulate HRD policy.

SUMMARY OF ACTIVITIES OF THE TRAIN-SEA-COAST PROGRAMME

The TRAIN-SEA-COAST Programme was launched in 1993 by UN/DOALOS with the support of the United Nations Development Programme, Science, Technology and Private Sector Division (UNDP/STAPS), and in collaboration with the UN and other organizations involved in course development. The Programme is an outgrowth of the Plan of Action on Training that was set forth during the Consultative Meeting on Training in Integrated Management of Coastal and Marine Areas for Sustainable Development in June 1993 by UN/DOALOS and UNDP/DGIP (predecessor to UNDP/STAPS).

The TRAIN-SEA-COAST network consists of nine centers located in Brazil, Costa Rica, Fiji, India, the Philippines, Senegal, Thailand, United Kingdom, and the United States.

The TRAIN-SEA-COAST Programme aims to strengthen qualified training/educational institutions and individuals with responsibilities in the field of coastal and ocean management. The instruments for capacity building are, on one hand, the development of local capacity for the design, production, and delivery of high-quality training courses tailored to the needs of the countries, and on the other hand, a cooperative training network for the exchange of standardized course materials, training staff, and information among the members of the network.

The Central Support Unit at UN/DOALOS provides the link between the training centers with an overall program management and coordination function. For HRD, this includes a series of courses for training course developers, instructors, and training managers; a training information system to manage the cooperative network and support facilities to provide, if necessary, tech-

nical advice to centers participating in the network; and periodic meetings to monitor network activities.

The first Course Developers Workshop took place in Stony Brook, New York, USA, January 23 to February 3, 1995. As a result of the Workshop, 19 participants from participating TRAIN-SEA-COAST centers and three from UN agencies were trained in the preparation of advanced, high-quality course material to TRAIN-SEA-COAST Standards in the form of Standardized Training Packages (STPs). Additionally, as members of the TRAIN-SEA-COAST network, the participants jointly discussed an extensive menu of courses and agreed, at the network level, on their particular course development tasks which will be carried out jointly or individually with other centers. For the next year, 10 courses are being prepared by different centers working alone or in partnership with another center. In preparing for the first Course Developers Workshop, UN/DOALOS received a number of additional applications from countries that wish to join the TRAIN-SEA-COAST Program. These applications, together with other institutions that may want to participate, will be considered for the next Course Developers Workshop tentatively scheduled to be held within the next year.

The benefits of the TRAIN-SEA-COAST Program accrue to a wide range of institutions/individuals interested in widening their knowledge and skills relevant to the planning and management of coastal and ocean areas. This better prepares them to assume new and expanded responsibilities within the coastal/ocean sector. Joint training programs and the creation of diploma programs is under discussion within the TRAIN-X system. In this respect, TRAINMAR is in the process of combining existing short course modules for new port managers to create a certificate program on Port Management at the global level. Separate diploma programs in Port Management and Shipping Management have been implemented on a trial basis at the regional level in West Africa since 1989.

CONCLUSIONS

The past 25 years of HRD efforts in the field of coastal and ocean management have offered up valuable lessons. Together with recent developments in the coastal/ocean sector, particularly the impact of the United Nations Conference on Environment and Development (UNCED) negotiations and the entry into force of the United Nations Convention on the Law of the Sea, they have set the stage for development of global HRD strategies.

The experience gathered through the work of UN and other organizations in the field of training and education indicates that strategies for HRD for the next decade would benefit from:

- Being more responsive to the specific needs of developing countries

- Being an instrument to build local capacity and enable countries to develop training solutions to addressing local problems
- Being more cost-effective
- Being more responsive to current and future manpower requirements and training needs
- Setting the stage for more active cooperation between UN and other organizations in the field of training and to promote cooperation between developing and developed countries
- Assist in the formulation of long-term, sustained HRD policies and programs

In this respect, a decentralized, cooperative training network strategy such as TRAIN-SEACOAST appears to be one of the most timely and effective tools for achieving the above-mentioned goals. The TRAIN-SEA-COAST Programme fills a gap in the field of training. It is responsive to the emphasis attached by the United Nations Conference on Environment and Development (UNCED) to capacity building and human resources development and within the framework of the 1982 United Nations Convention on the Law of the Sea. The TRAIN-SEA-COAST Programme will provide valuable support to countries in their efforts to realize the many benefits in the field of coastal and ocean management.

REFERENCES

- United Nations: Action Plan for Human Resources Development and Capacity Building for the Planning and Management of Coastal and Marine Areas. United Nations Development Programme, Division for Global and Interregional Programmes and the UN Division for Ocean Affairs and the Law of the Sea, Office of Legal Affairs. New York, March 1994, 58 p.
- United Nations: Report of the Consultative Meeting on Training in Integrated Management of Coastal and Marine Areas for Sustainable Development. Organized and convened by the UN and UNDP (Sassari, Sardinia, Italy, 21-23 June 1993). United Nations Development Programme, Division for Global and Interregional Programmes and the UN Division for Ocean Affairs and the Law of the Sea, Office of Legal Affairs.
- United Nations Conference on Trade and Development. Follow-up to the recommendations adopted by the Conference at its eighth session: policies for human resources development, with particular reference to technical cooperation activities for trade and development. The Development of Human Resources for Trade. Report of the Secretary-General. TD/B/39(2)/14. 1 February 1993. 23 p.
- Vallejo, S.M. Capacity Building and National Planning. Paper presented at the Second International Conference on Oceanography, Lisbon '94 "Towards Sustainable Use of Oceans and Coastal Areas, Lisbon, Portugal, 14-19 November 1994, 22 p.

THE INTERNATIONAL OCEAN INSTITUTE NETWORK

Margaret J. Wood

International Ocean Institute
Dalhousie University
Halifax, Nova Scotia, Canada

ABSTRACT

The International Ocean Institute (IOI) is an independent, nongovernmental, international, nonprofit organization. The IOI headquarters is located in Malta with eight operational Centres worldwide. The task of IOI is to promote education, training, and research. The peaceful use of ocean space, its resources, their management and regulation, as well as the protection and conservation of marine resources, are subsequently enhanced.

THE IOI NETWORK

The IOI network consists of a number of internal and external components, which include operational centers, host universities (e.g., Dalhousie University), donor agencies (e.g., UNDP), alumni, faculty, organizations and institutes (e.g., CRC/URI), and UN agencies (e.g., IOC). These networks are maintained through training programs, newsletters (e.g., *Across the Oceans*), publications (e.g., *Ocean Yearbook*), conferences (Pacem in Maribus), the Internet, memorandums of understanding (MOU), in-house committees, and public relations brochures.

These networks build capacity, contribute to and draw from other initiatives, and must become self-sustaining. In order to be successful, networking requires cooperation and collaboration to ensure effective training and education.

It is important to recognize that lessons can be drawn from past experience. However, the world is changing at such a rapid pace that it is critical to look ahead in an effort to meet the future needs of a dynamic world. In the words of Thomas Mann, "As I write, the sea whispers to me and I close my eyes. I am looking into a world unborn and formless, that needs to be ordered and shaped." A cooperative and collaborative approach is required to ensure that the final product that Thomas Mann wrote about is sustainable.

Education and training are vital for setting up formal and informal networks. Education, public awareness, and training are processes by which people reach their full potential. Education is critical for sustainable

development and for improving the capacity of the people to address environmental and development issues. Both education and training are indispensable for changing people's attitudes so that they have the capacity and are willing to address sustainable development concerns. They are also critical for achieving environmental and ethical awareness, reinforcing values, attitudes, skills, and behavior consistent with sustainable development, and for effective public participation in decision-making.

Training programs are fundamental in raising societal awareness, particularly for those people who hold key positions to influence, regulate, and teach others. Programs need to be multidisciplinary, aimed at policymakers, planners, scientists, technicians, international lawyers, the private sector, and NGOs. Demand exists for courses that contribute to the development of a society that is willing to cooperatively and actively protect the environment for future generations. The International Ocean Institute (IOI) has vast experience in the area of training, and yet it has much to learn.

The IOI is an independent, nongovernmental, international, nonprofit organization with its head office located in Malta. The IOI task, as defined in its statutes, is to:

Promote education, training, and research to enhance the peaceful uses of ocean space and its resources, their management, and regulation, as well as the protection and conservation of the marine environment.

The Institute activities are largely, but not exclusively, aimed at organizations, institutions, and people in developing countries. The main objective of the training program is to focus attention on the ocean environment with special reference to land-sea-air interactions, the problems of small island states, and the sustainability of the oceans, especially concerning enclosed and semi-enclosed seas. The approach is to bring together various specialists involved in ocean management (i.e., science, technology, economics, law, and management) and to help them transcend their narrow specializations and create a common language leading to a common culture or purpose. This language must be kept simple so that the average person can understand and help in the creation of a new global environmental culture. In its work, the IOI aims to serve as stimulus and catalyst, but not to be utopian. The purpose of the training program is to deepen the understanding of the ever-increasing importance of the oceans and their resources in world politics and sustainable economic development, and to assist developing countries to form a core of decision-makers who are fully aware of the complex issues of ocean management.

In recent years, IOI has grown from two to eight Operational Centres (see Annex 1) located in the coastal zones of Canada (Dalhousie University, Halifax), China (State Oceanic Administration, Tianjin), Costa Rica (Universidad Nacional, Heredia), Fiji (University of the South Pacific, Suva), India (Indian Institute of Technology, Madras), Japan (Yokohama City University, Yokohama), Malta (University of Malta, Msida), and Senegal (Oceanographic Research Centre, Dakar). Arrangements are underway to establish three additional Operational Centres in 1995 that will be located in Qatar, South Africa, and Romania. This expansion has and will continue to allow the Institute to improve and expand the number and types of courses that can be offered. In addition to courses focusing on integrated ocean management (i.e., The Entry into Force of the United Nations Convention on the Law of the Sea, its Implementation and Agenda 21, Canada, June-August 1995, 10 weeks), the Institute provides courses with an emphasis on regional issues within a global context (i.e., Coastal Zone Management as a Sustainable Process, India, October-December 1995, six weeks), and courses that examine a specific topic in detail (i.e., Corraline Workshop, Fiji, December 1995, one week). All training programs are conducted in English. However, the Operational Centres in Senegal and Costa Rica intend to offer training programs in French and Spanish, respectively, and the Operational Centre in Qatar will provide training in Arabic.

In an effort to incorporate the most advanced teaching technologies in its training programs, IOI is developing a series of teaching modules, which consist of

text, audio tapes, videos, and simulations that can be exchanged within the IOI network. These will also be applied to distance learning and extension programs.

In the future, all IOI courses of two or more weeks will include a two-week introductory training module, which will cover the basic concepts of integrated ocean management and will be accompanied by a core reader. This initiative will serve a dual purpose to ensure that all participants have a basic grasp of general ocean principles and management practices and to provide a common thread running through all IOI courses.

A feature that makes the IOI training program model unique is its multidisciplinary approach. Topics covered in the training programs include *inter alia*, oceanography, Law of the Sea, sustainable development and implementation of the UNCED programs, management of living and nonliving resources, coastal zone management, development of ports and harbors, shipping and navigation, technology development and transfer, national legislation and institutional infrastructure, regional cooperation and development, and the impact of the UNCLOS and UNCED processes on the restructuring of the UN system. With the increasing demands, pressure, and time constraints placed on people today, these intensive courses are well-designed for people who require training yet cannot be released from their jobs for long periods of time.

The IOI classroom is not seen as a north-south opportunity to mold or shape participants, but rather a place to share ideas and participate in a dialogue to examine global or regional problems and identify solutions. Case studies, seminars, simulation exercises, and field trips are conducted to supplement the lectures. The participants are also provided with voluminous reference readings and handouts, which they are encouraged to take home and make available to others. To enhance their learning experience, their nonacademic needs are not neglected. Social events and tours to local points of interest are organized, and a sense of community among participants is nurtured. It is no small feat to successfully bring together an average of 25 people from various academic, cultural, and religious backgrounds.

Each participant is required to write a major paper during the training program and briefly present it to the staff and participants during the final week of the course. These papers can be done individually or in small groups (which is strongly encouraged). The papers reflect the research that has been conducted, as well as the knowledge gained, during the training program and relate it to a specific issue from their country or region. All these papers are compiled into a single document, *Participant Papers*, and provided to the course participants and also to each of the Operational Centres, providing an excellent reference document.

Course evaluations are completed by all participants

at the conclusion of each training program and a Course Report is published. The evaluation examines both the administrative and substantive aspects of the training program as well as exploring interest in alumni activities. The evaluation process provides an excellent review and resource document for future course development. In addition to a summary of the evaluation, the Course Report includes the syllabus, an overview of the lectures/field trips/social events, and the mailing addresses of participants, lecturers, and staff. The Course Report is circulated to course participants, staff, lecturers, and to all Operational Centres.

To ensure that IOI training programs reach the widest possible audience with the very limited amount of funding available, the IOI Training Policy requires that IOI scholarships can only be awarded to participants for one training program. Alumni are welcome to apply for additional IOI training programs; however, they must secure external funding in order to do so (this does not apply to Alumni Refresher Courses).

The first regional Alumni Refresher Course was conducted in 1993. It brought together all available alumni from the Indian Ocean region to discuss new developments, initiatives, and recent activities, and to encourage collaborative efforts among the group. This one-week event was well received by the participants and staff and will serve as a model for alumni courses in other regions in the future.

Training must be more than an isolated onetime experience. There is a critical need to sustain and support alumni. Alumni networking is a very important aspect of IOI activities. An Alumni Directory, organized by country, includes mailing and E-mail addresses, telephone, fax, and telex numbers, and indicates the year and the training program the person attended. The Alumni Directory is updated regularly and distributed to all alumni and Operational Centres. The Directory is an obvious, yet simple, cost-effective way to promote networking both among alumni and between alumni and Operational Centres.

The Institute publishes a quarterly newsletter, *Across the Oceans*. This publication includes news from the Operational Centres and alumni, and the names and addresses of participants who attended recently conducted IOI training programs, as well as items on recent ocean-related events. The editor invites submissions from alumni and other sources to be considered for publication. *Across the Oceans* is distributed to alumni, staff, lecturers, and others who are interested in the ongoing activities of the IOI. *Across the Oceans* provides a voice to a very large and diverse audience.

Strengthening IOI Operational Centre networks is done in a variety of ways. Networking is part of the Project Document developed to manage the outputs and objectives under the World Bank, Global Environmental Facility (GEF) grant administered by UNDP. Al-

though only four of the eight Operations Centres receive funding from the GEF grant, it has served as the networking impetus.

One of the most important elements of Operational Centre networking is the regularly scheduled meetings of the Centre representatives that are held to discuss issues of common interest and to conduct strategic planning in an effort to harmonize activities. The committee is composed of the Centre Directors, the Founder and Honorary President (Chairperson), the Executive Director, and one representative from each of the Governing Board and the Planning Council. A senior administrator from each of the host universities is also invited to participate in the meetings. By convening these meetings at the Operational Centres, it provides an appreciation of the context in which the other operates.

The Course Development Committee, having the same membership, meets in conjunction with the Centre Representative to review proposed training programs, share materials and newly developed programs, and report on recently conducted training programs. One of the many benefits of this peer review is the improvement in the quality of training programs.

Operational Centres are encouraged to collect information from their regions and circulate it within the IOI network. Quarterly Action Reports, which are regularly submitted to the head office from each Operational Centre, are also circulated within the network. This ensures that everyone is aware of what is taking place throughout the network, and it also makes for coordinated and synergistic functioning.

Operational Centres operate autonomously. However, there is a support system in place whereby established Centres assist a new Operational Centre in designing an IOI framework from which to create its own identity. Staff from new Operational Centres are also invited to participate in training programs conducted by more established Centres.

The Operational Centres are generally staffed by three salaried positions—a director, a coordinator, and a secretary. However, variations do exist from Centre to Centre. There are a large number of volunteers who work on an ad hoc basis to help get the job done.

Internet (E-mail) has proven to be a valuable, efficient, and inexpensive tool for networking between Operational Centres, between alumni, and to answer general inquiries. Some of the Operational Centres that are on-line have established a regular communication routine that transcends geographical barriers. An effort is being made to bring all Operational Centres on-line within the next year. Software is presently being developed by one of the Operational Centres that will link the libraries of the IOI System by Internet. Uses of an on-line system will continue to be discovered and explored in an effort to enhance communication and research capacity.

Public relations brochures are designed by each Operational Centre to include information pertaining to their regional activities, placing them in the global context of IOI activities. Brochures to announce individual training programs (see Annex 2) and solicit applications for participation are published on a regional basis. A yearly summary brochure (see Annex 3), highlighting scheduled training programs worldwide, provides applicants with an opportunity to select and apply for a training program that best suits their particular needs. The IOI Canada Operational Centre is writing and designing a brochure for fund-raising purposes. These promotional materials are distributed to all the Operational Centres to keep the flow of information moving and serve to support and promote the activities of one another.

Alumni are one of the best sources of participant applications for IOI training programs. There is virtually no one better suited to identify people who would benefit from, or contribute to, an IOI training program. Operational Centres are encouraged to send Course Announcements and application forms to alumni, requesting that they circulate them to the appropriate people. Training program announcements and application forms are also sent to ministries of foreign affairs, universities, government departments, and institutes.

Each Operational Centre is affiliated with a university through a Memorandum of Understanding (MOU). Each MOU is written to ensure the mutual benefit of both organizations. One advantage for the Operational Centre is the opportunity to draw on the expertise of the host. For example, Dalhousie University has excellent faculty in oceanography, biology, maritime law, and environmental and coastal management. A number of these faculty help prepare course modules and they lecture during the training programs. As the staff of each Operational Centre is small, the host university also provides a well-established infrastructure and reputation from which to operate. The IOI training programs are well known and highly regarded worldwide, drawing participants and lecturers from all parts of the globe. There are numerous examples of alumni who have returned to the host university to pursue graduate studies. Linkages between the host universities have also occurred as a result of the establishment of IOI Operational Centres on campus. For example, Dalhousie University and the University of Malta have signed an MOU to exchange students and faculty between their classics departments — Neptune and Poseidon would approve!

Networks and linkages have developed over the years between IOI and similar institutes and organizations. The IOI has signed an MOU with UNESCO's Intergovernmental Oceanographic Commission (IOC) and one with the UN University (UNU). IOI is finalizing an MOU with the Coastal Resources Center (CRC)

at the University of Rhode Island, and another one with the International Centre for Coastal and Ocean Policy Studies (ICCOPS) in Genoa, Italy. These networks provide a variety of opportunities for collaboration and support. For example, CRC and IOI-Costa Rica are discussing the possibility of collaborating on a training program. There are a number of common points that exist between the two centers that make this an obvious and natural starting point. Another example of networking is publication of the dates and locations of IOI training programs in the IOC newsletter. This newsletter is published in the official United Nations languages and reaches a large audience. As a result of this initiative, the Institute receives correspondence expressing an interest in the training programs from developing countries and organizations that have not previously participated.

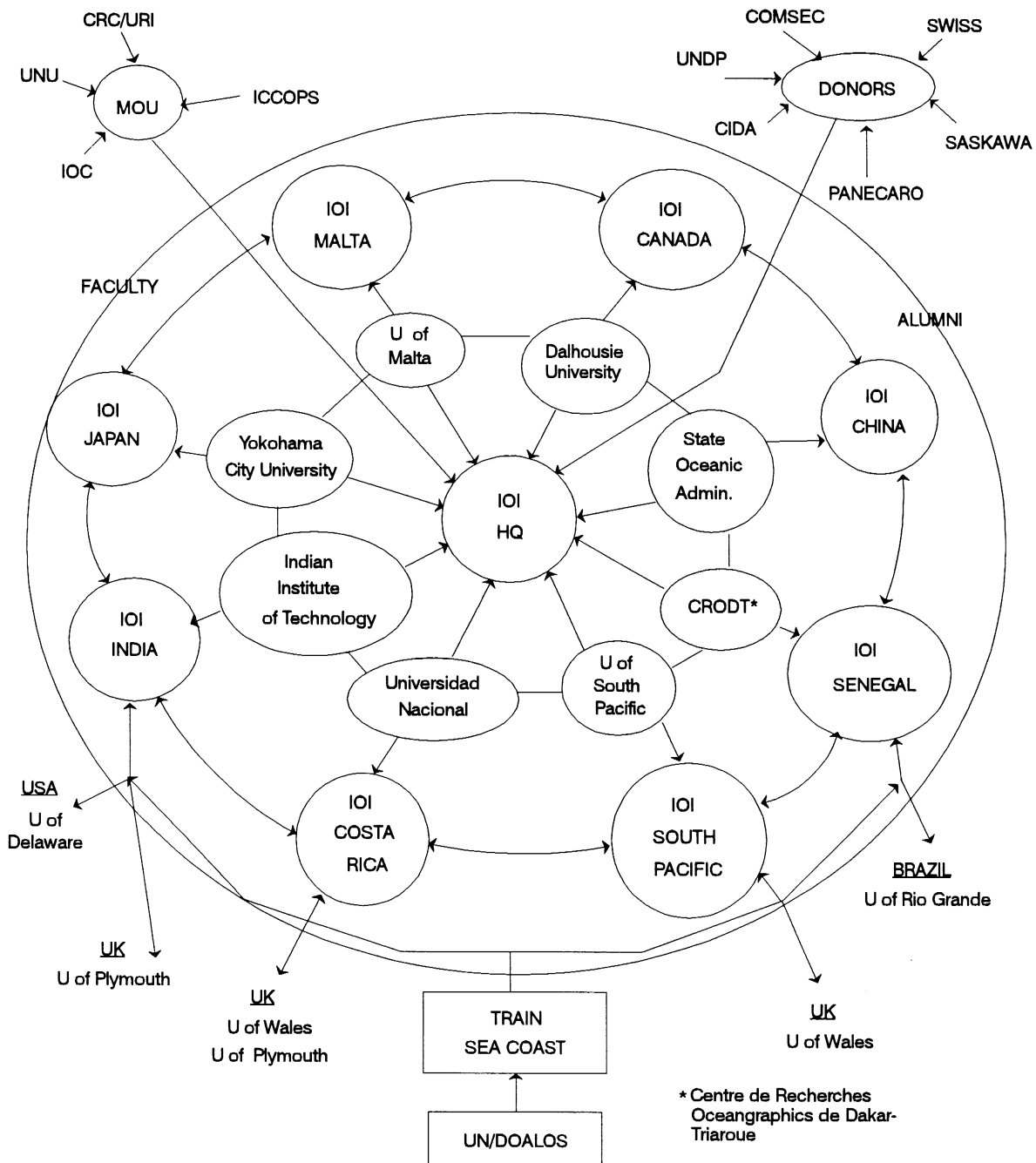
The IOI holds an annual conference, *Pacem in Maribus*, or Peace in the Oceans. To date, 22 *Pacem in Maribus* conferences have been conducted in all parts of the world. They explore many global and regional issues as they arise and bring together an international body of experts to examine and debate these matters. The proceedings are summarized into *Conclusions and Recommendations* for action, combined with the papers that were presented and subsequently published.

The IOI produces *Ocean Yearbook*, published by the University of Chicago Press. Eleven volumes (600 pages each) have been published to date. The purpose of *Ocean Yearbook* is to produce a publication that transcends sectoral boundaries and presents data, statistics, and developments on all major marine activities.

In conclusion, this paper has briefly explored the networks that exist within the IOI. Some of the networks are more obvious than others, although the list is not complete. As the Institute continues to grow, there are a number of arguments which can be put forward in support of network strengthening, both within and outside the Institute:

- The need to avoid re-creating the wheel—there are a number of established courses and training programs that are excellent.
- The need to avoid competing for limited financial resources—as budgets continue to be cut and funds become more limited, there needs to be a more coordinated and cooperative approach.
- The need to avoid working at cross-purposes—executing agencies need to take a more coordinated and cooperative approach.
- The need to share expertise and experience—there is an excellent group of internationally recognized resource people available.

- The need to support and assist in promoting activities—there are a number of very effective existing vehicles which require very little additional effort.
- The need for open dialogue and cooperation among institutes, the community, various levels of government, and universities—there is a role to play at all levels.
- The need to support alumni—alumni, staff, and associates of IOI are fondly known as the “Ocean Mafia”—their numbers are in the thousands, and they should be seen as a powerful force.



ANNEX 1**IOI - CANADA**

Margaret J. Wood
 Director, IOI-Canada
 Dalhousie University
 1226 LeMarchant Street
 Halifax, Nova Scotia
 CANADA B3H 3P7

Fax: 1 902 494 2034
 Tel: 1 902 494 1737
 E-Mail: IOIHFX@AC.DAL.CA

IOI - CHINA

Professor Hou Wenfeng
 Director, IOI-China
 State Oceanic
 Administration
 National Marine Data
 and Information Service
 93 Liuwei Road, Hedong District
 Tianjin 300171, China

Fax: 86 22 430 4408
 Tel: 86 22 430 1297
 Tlx: 23138 NODC CN
 E-Mail:
 HOUWF@BEPC2.IHEP.AC.CN

IOI - COSTA RICA

Dr. Alejandro Gutiérrez
 Director, IOI-Costa Rica
 Universidad Nacional
 P.O. Box 86
 Heredia, Costa Rica

Fax: 506 260 2546
 Tel: 506 277 3594
 E-Mail:
 GECHEVER@CARIARI.UCR.AC.CR

IOI - FIJI

Dr. G. Robin South
 Director, IOI-South Pacific
 University of the
 South Pacific
 Marine Studies Program
 P.O. Box 1168
 Suva, Fiji

Fax: 679 301490
 Tel: 679 305446
 Tlx: FJ2276
 E-Mail: SOUTH_R@USPAC.FJ

IOI - INDIA

Professor R. Rajagopalan
 Director, IOI-India
 Department of Humanities
 & Social Sciences
 Indian Institute of Technology
 Madras 600 036 India

Fax: 91 44 235 0509
 Tel: 91 44 2351365 Ext 3350
 Tlx: 041 8926
 E-Mail: IMGT1@IITM.ERNET.IN

IOI - JAPAN

Tsutomu Fuse
 Director, IOI-Japan
 Yokohama City University
 22-2 Seto Kanazawa-Ku
 Yokohama-Shi 236 Japan

Fax: 81 45 787 2316
 Tel: 81 45 787 2311

IOI - MALTA

Dr. K. Saigal
 Executive Director
 International Ocean Institute
 P.O. Box 3
 Gzira GZR 01, Malta

Fax: 356 346502
 Tel: 356 346529

IOI - SENEGAL

Dr. Diacara Toure
 Director, IOI-Senegal
 Centre de Recherches
 Oceanographiques de
 Dakar-Thiaroye (CRODT)
 Dakar, Senegal

Fax: 221 324307
 Tel: 221 340536

ANNEX 2

The purpose of the Training Programme is to deepen the understanding of the ever-increasing importance of the oceans and their resources in world politics and sustainable economic development; to assist developing countries in the formation of a core of decision-makers fully aware of the complex issues of ocean management; and to maximize benefits to be derived from the United Nations Convention on the Law of the Sea through the proper integration of ocean management into national and international development strategy.

The training program covers:

- Oceanography
- Law of the Sea
- Sustainable Development
- Implementation of the UNCED Programs with particular emphasis on Chapter 17 of *Agenda 21*
- Management of Living Resources
- Management of Nonliving Resources
- Coastal Zone Management
- Development of Ports and Harbors
- Shipping and Navigation
- Technology Development and Transfer
- National Legislation and Infrastructure
- Simulation Exercise on Contract Negotiation

During the past 14 years, more than 50 courses (10 weeks each) have been completed, attended by approximately 1,000 participants from more than 100 developing countries. The Class B Training Programme is specifically designed to benefit developing country, mid-career professionals who are responsible for the various aspects of marine management of their Exclusive Economic Zones. The aim is to increase awareness of the fact that ocean management adds a new dimension of development strategy, that it requires broad interdisciplinary skills, new institutional and legal infrastructures, and new forms of local, national, international, intergovernmental, and nongovernmental organization and cooperation.

The Program is broadly interdisciplinary—the new science of ocean management. The ocean must be seen as a system with varied users and multiple uses that often compete and conflict.

Conducted in cooperation with Dalhousie University, Canada, this interdisciplinary course takes place on the Halifax Campus. Roundtable discussions, exercises, and a number of field trips are organized in addition to lectures.

Admission Requirements. Participants should preferably be between 25 and 40 years old, have an undergraduate degree or equivalent experience, and be a mid-career civil servant or academic. They should be prepared to step out of their fields of specialization and be exposed to broad interdisciplinary work. The Program is not intended to provide specialized training. It is a foundation program in the new and very important field of development

strategy. Participants should be prepared for a heavy workload. For preparation and presentation of their Country Report they should bring their own national legislation that relates to marine activities, and the latest development plan of their governments. The course is conducted in English and participants must have a good working knowledge of this language.

Scholarships. Scholarship for the Class B course is \$10,000 CAD. This covers room and board for the course, air fare, teaching materials, tuition, health insurance, a small allowance, and field trip expenses. For the provision of scholarships, the following possibilities should be considered: (i) in the case of African, Caribbean, and Pacific (ACP) countries, European Economic Community (EEC) scholarships, through the EEC Resident Representative; (ii) United Nations Development Program (UNDP) scholarships through the country Resident Representative; (iii) Commonwealth Secretariat, Commonwealth Fund for Technical Cooperation (CFTC) Training Awards through the country Point of Contact (POC); (iv) in the case of Organization of American States (OAS) member countries, applications for financial assistance are available from the OAS office in the country of residence; (v) many national and regional science academies provide scholarships for training/education abroad; (vi) in some cases the participant's own government can provide full scholarships; (vii) a limited number of scholarships are available directly through IOI. These can only be granted to those participants who have attempted and been unsuccessful in securing a scholarship or funding from other sources.

Applications. Application forms or enquiries should be sent to:

Margaret J. Wood	Tel: 1 902 494 6623
Director, IOI Halifax	Fax: 1 902 494 2034
International Ocean Institute	E-mail:
Dalhousie University	IOIHFX@AC.DAL.CA
1226 LeMarchant Street	
Halifax, Nova Scotia	
CANADA B3H 3P7	

All applications must be completed in full and endorsed by an appropriate government ministry or department or by a national or regional organization. They should clearly indicate which course the candidate is being nominated to attend. Copies of all funding application correspondence must accompany the application form to facilitate confirmation and collaboration.

Application Deadline

1996 Training Program - February 29, 1996

ANNEX 3

Venue	Course Title	Dates	Duration	Contact
Heredia, Costa Rica	Satellite Imagery	February	3 days	Costa Rica
Colombo, Sri Lanka	Advanced Alumni	March	1 week	India
Madras, India	Coastal Zone Management	April	4 weeks	India
Suva, Fiji	Coastal Zone Management with a Focus on Small Island States	May - June	6 weeks	Fiji
Tianjin, China	Seabed Mining	June - July	5 weeks	China
Madras, India	Coastal Zone Management as a Sustainable Process	June - July	6 weeks	India
Halifax, Canada	The Entry into Force of the United Nations Convention on the Law of the Sea, its Implementation and Agenda 21	June - August	10 weeks	Canada
Suva, Fiji	Resource and Environmental Economics	July - August	5 weeks	Fiji
Port Moresby, Papua New Guinea	Leaders Seminar	September	2 days	Fiji
Mauritius	Advanced Alumni	September	1 week	India
Havana, Cuba	Sustainable Development of Marine Resources and the Protection of the Marine Environment	September - October	5 weeks	Canada
Suva, Fiji	Coastal Fisheries Management & Development	October - November	5 weeks	Fiji
Madras, India	Coastal Zone Management as a Sustainable Process	October - December	6 weeks	India
Suva, Fiji	Corraline Workshop	December	1 week	Fiji
Heredia, Costa Rica	Decision Makers Workshop	TBA	2 days	Costa Rica
Heredia, Costa Rica	Sea Law and Ocean Policy	TBA	2 weeks	Costa Rica
Heredia, Costa Rica	Ocean Management	TBA	2 weeks	Costa Rica
Dakar, Senegal	Leadership Workshop	TBA	2 weeks	Senegal
Dakar, Senegal	Planning and Management of Coastal Zones	TBA	8 weeks	Senegal

NETWORKS AND PARTNERSHIPS

PANELISTS: S. Vallejo, M. Bandara, E. Ozhan, M. Wood

MODERATOR: Hilconida Calumpong

RAPPORTEUR: Dianeetha Sadacharan

DISCUSSION QUESTIONS

- How can a network benefit ICM and how can they contribute to it?
- What can universities get from and give to a network?
- How can universities benefit and what can they contribute to nonuniversity members?
- How can networks be used as a means to share and develop curriculum materials and faculty/trainers?
- What are the advantages and disadvantages of decentralized versus centralized approaches?
- What are the merits of national versus regional versus international networks?

RAPPORTEUR'S REPORT

The panelist presentations provided a very good overview of several networks relating to coastal management that are currently in operation. Of the four networks that were presented, two are regional and two are global. Both regional networks are fairly new (two to three years old). The MedCoast network covers a relatively small geographic area (i.e., the Mediterranean and Black Sea). MedCoast has a training component, a research component, and a conference series. MedCoast has broad-based support, including support from areas outside the region. NETTLAP covers a large geographic area, an important area where more than half the world's population lives. Initiated by UNEP as a response to UNCED, NETTLAP has the enormous task of being the "small fish in a big pond." In both MedCoast and NETTLAP, a central concern is stable and long-term funding, raising major questions regarding sustainability. Madduma Bandara asked if networks are "birds of paradise" or, in other words, do they come

and go, forming to serve a useful purpose and then, once that purpose is satisfied, disappearing.

The two global networks are International Ocean Institute (IOI) and TRAIN-SEA-COAST. For the last 15 years, the IOI has conducted short-term multidisciplinary training courses. It has eight operational centers which enable IOI activities to cover a broad geographic scope. IOI has a strong network of alumni and attempts to build linkages among them. In addition to the IOI network of operational centers, it has a larger circle of linkages via MOUs and other collaborating arrangements with universities, NGOs, and UN agencies. Here, too, there is no long-term commitment of funds, hence the sustainability of the IOI network may be an issue. TRAIN-SEA-COAST is a recent global network of nine institutions with a wide geographic coverage. It was initiated by UNDP as part of the UN TRAIN-X family. The main objectives include facilitating training by providing standardized training curricula and methodology and by providing skilled trainers. It also facilitates cooperation between nations to share information, courses, and training materials. This approach reduces costs and optimizes efforts in producing and delivering training courses.

Max Agüero briefly described the Asian Fisheries Social Science Research Network (AFSSRN), whose activities deal with research, training, publications, workshops, and internships. Evaluation of its performance indicates that the network could have been more successful had funds been available on a more sustainable basis. There is a danger in networks becoming self-perpetuating even if they are redundant. Ed Gomez briefly described a national network operating in the Philippines—The Philippine Association of Marine Sciences—which provides a forum for scientists to exchange information, ideas, and research findings. The network was initiated with external funding but is now self-sufficient.

Discussion: The first topic of discussion was that there appear to be significant efforts in ICM training. It was suggested that there is a need to harmonize these efforts to ensure that the philosophy and concepts are the same. However, there was a divergent opinion regarding this issue. Some participants felt competition is desirable, as it leads to diversity of ideas and thoughts, and such diversity should be encouraged, particularly considering the newness of ICM and the lack of consensus on core theory and approaches. Additional views expressed included:

- One of the purposes of universities is to promote different approaches and diversity of ideas.
- There is a need now, and in the foreseeable future, for significant training in ICM. There is only one place where ICM education can happen—a university.

Recommendations and Conclusions: The following points were considered crucial in considering networks and partnership arrangements:

- There is a need for global sharing of information.
- There is a need for cost-effectiveness and to assist countries in tailoring training programs to suit each country's needs.
- Cooperation among countries within or outside the networks is essential.
- There is a need to increase information flow among universities.
- We should try to draw lessons from the many training programs, newsletters, and conferences (e.g., what makes programs work, what program characteristics are more successful than others).
- The USAID/CRC Intercoast newsletter should do an annual review of training programs. (The UN is putting together a database on training programs.)

DONOR INITIATIVES FOR BUILDING HUMAN CAPACITY FOR INTEGRATED COASTAL MANAGEMENT

PANELISTS: T. Johnson, M. Hatzios, S. Vallejo

MODERATOR: Madduma Bandara

RAPPORTEUR: Max Agüero

DISCUSSION QUESTIONS

- What is the response to workshop recommendations and the Call to Action?
- What are donors doing in ICM?
- Why has donor interest in ICM increased at this time?
- What has been the donor experience in educational capacity building?
- How can the ICM short-term training initiatives of donors be more closely linked to long-term educational capacity building?
- How can donor recipients ensure they get the most out of donor assistance?

RAPPORTEUR'S REPORT

Presentations were made by three donor representatives. Marea Hatzios from the World Bank listed several reasons why donors are interested in ICM:

- Increasing coastal population
- Urban growth in coastal area
- Declining quality of life
- Declining quality of coastal ecosystems and biodiversity

She mentioned that the World Bank is promoting ICM in several ways—through development of guidelines and handbooks, with short-term training, and through integration of coastal issues in development plans. Most of the World Bank's experience in ICM-capacity building, to date, has been focused on short-term training, technology transfer (i.e., GIS), support, and public awareness. At present, there are no resources provided to develop university degree

programs. World Bank assistance will be primarily concentrated in training and policy design. The most likely source of funding for educational program development would be either through trust funds or GEF, which focuses more on national and regional activities.

Stella Maris Vallejo sat in for Phil Reynolds of UNDP. UNDP has established several training networks using the TRAIN-X methodology. TRAIN-SEA-COAST is the most recent member of the TRAIN-X family and is the collaborative effort of UNDP in coastal management. Training is a central human resources development strategy for UNDP for several reasons. TRAIN-X promotes the development of training capacity in local institutions and is used to develop high-quality standardized training materials for trainers and institutions involved in the network. It has several advantages:

- Cost-effectiveness
- Promotes sustainability of efforts
- Has long-term impacts
- Builds up permanent capabilities
- Assists with long-term, sustainable policy design
- Increases training cooperation between the UN and other institutions
- Promotes cooperation between developed and developing countries
- Provides common training packages used and shared among members

Funding is an increasing concern within UNDP, and the TRAIN-SEA-COAST program can make a small amount of funds go a long way. It does not provide funding to implement the training courses, which is the responsibility of the cooperating training institutions.

Twig Johnson from USAID indicated that international development assistance is facing serious scrutiny in the United States. USAID has very successfully cooperated with URI in marine and coastal programs for more than two decades, along with many national governments, NGOs, and local communities. However, integrated coastal management is not the first priority in most developing countries. USAID priority areas have always been in capacity building. Many donor agencies, including USAID, are facing declining budgets, so there is very little funding available for integrated coastal management initiatives. Institutions interested in ICM and capacity building need to be creative in order to identify and mobilize resources. The recent coral reef initiative may be one marketing approach. Donors are also interested in engaging in real partnerships with countries and their institutions, and new projects must have specific and explicit outcomes. It is difficult to mobilize resources for capacity building because it is hard to understand the direct benefits. Increasing importance is being placed on demonstrating tangible results. Where can we point to coastal resources which are better managed because of a development project? In addition, projects must become better at telling the story of their successes. ICM, while small in terms of the overall portfolio within USAID, will continue to draw attention.

Discussion: The three brief presentations were followed by discussion on methods of financing capacity-building initiatives, goals of donors and recipients, and methods of financing. Robin South pointed out that donors' priorities drive most development assistance programs, which may or may not be in tune with local needs and are also subject to frequent changes. In this context, it is hard to sustain long-term commitments. For instance, USAID cut off all development assistance to countries in the South Pacific on very short notice and with little debate. It was suggested that forums are needed for donors where regional concerns regarding priorities can be expressed. There was some discussion of the roles of the international research institutions (CIGARs), but donor representatives felt that they will play a decreasing role. One opinion among the workshop participants was that they draw off too many financial resources which, if spent on developing and strengthening local/indigenous institutions, could be stretched much further.

There was discussion about the need to present results more rigorously. Donors need a set of guiding principles that approach decisions and their benefits in terms of decades. Finally, university systems have promising potential to highlight the need for and benefits of ICM and are good long-term partners for donors.

SECTION 5 STRATEGIES FOR BUILDING UNIVERSITY CAPACITY

An Integrated Program for Educating and
Sustaining Coastal Managers
David Gitlitz 147

Roundtable Discussion
The Changing Nature of Educating Coastal
Managers—New Paradigms, Technology, and
Approaches 150

Rapporteur's Report
Recommendations for Building University
Capacity in ICM—Program Models and
Curriculum Issues 152

Rapporteur's Report
Recommendations for Building University
Capacity in ICM: Human Resources Issues,
Institutional Strengthening Issues,
Consultative Arrangements, and Partnerships 156

Plenary Discussion
Recommendations for Building University
Capacity in ICM 158

AN INTEGRATED PROGRAM FOR EDUCATING AND SUSTAINING COASTAL MANAGERS

David Gitlitz

University of Rhode Island
Department of Languages
Kingston, R.I., U.S.A.

ABSTRACT

This paper proposes a structure for a master's degree program in coastal management offered by a consortium of international institutions. The consortium's diverse goals should include advancing research in basic science and in managerial and policy areas relevant to the management of coastal zones; developing and disseminating knowledge about applications for the products of such research; educating decision makers so that they will give wise, substantial, and consistent support; educating and training the managers at various levels; nurturing a feedback environment in which experience at all levels enriches knowledge and procedures at all levels. The degree should consist of core of material, a variety of specialized tracks, and fieldwork preferably in at least two countries or regions. The degree should be jointly offered by individual consortium members and to the consortium as a whole, with courses scheduled at diverse locales and with many faculty serving as International Adjuncts, holding fractional appointments at foreign institutions in addition to their own. One consortium institution at a time should act as the hub, responsible for overall management of the program. Practica and fieldwork at all levels, both in connection with the master's program and in other diverse projects, should be central to the consortium's efforts. Equally important is the dissemination of the results of these efforts, through conferences, workshops, training programs, and publications.

INTRODUCTION

In this paper, I am going to sketch one possible model for a multifaceted, well-integrated program aimed at enhancing the world's capabilities for dealing with coastal resource management issues. I know this is presumptuous goal, especially for someone like myself who is not a coastal resources manager, nor an experienced field worker, nor a veteran of the NGO funding wars, nor, for that matter, even a scientist. I am a teacher (Hispanic culture) and a former university administrator. Still, my very status as an outsider, albeit one with a couple of decades of experience in building and nurturing programs of a "pure" academic and applied nature, may give me a valuable perspective that an insider—necessarily caught up in the pressures of specific research, teaching duties, and funding imperatives—might not have.

Let me start with some assumptions. The first is that wisely managing the world's coastal resources is almost unbelievably complex. Scientifically complex in that dozens of rapidly evolving disciplines are involved, not all of which habitually talk to one another, and some of which are extremely costly to pursue. Politically complex, because it involves jurisdictions that overlap and compete at all levels: this is true of the political entities that share responsibilities for coastlines and coastal waters, and for the intellectual organizations—universities and research institutes—that concern themselves with coasts. Managerially complex, because it will not work unless the prime ministers and bank presidents and scientists and municipal governments and beach resort owners and peasants (along the watersheds) and fishermen (in the estuaries) all cooperate.

The second assumption is that to have any chance

of success, our efforts must be multidirectional and must include, at a minimum, these goals:

- Conducting research in the basic sciences relevant to the management of coastal zones
- Conducting research in managerial and policy areas relevant to the management of coastal zones
- Developing applications for the research products
- Disseminating knowledge about research applications
- Educating decision makers so that they will give wise, substantial, and consistent support
- Educating and training managers at the regional and local levels
- Nurturing a feedback environment in which experience at all levels enriches knowledge and procedures at all levels

The third assumption is that efforts must be truly international. Partnerships must cross cultures at every level and expertise and resources must be shared with equity. Over the long term, nothing will sustain effort better than communal pride in shared achievements.

The fourth is that constant communication is crucial at all levels, and that our rapidly evolving communications technology either provides, or soon will provide, the tools to make that possible.

For a variety of reasons, I think that academic institutions are probably best suited to sit at the center of the network of integrated efforts. Particularly apt is the sort of academic entity which, in the United States, has come to be known as a Land Grant university and in other countries, goes by another name. This model incorporates teaching and granting degrees; continuing education with short courses, seminars, and certificate programs; basic and applied research; feedback mechanisms; and outreach activities using all sorts of media. The following outline has the Land Grant university model at its intellectual core and incorporates several components. Let me say again that I think the underlying assumptions and goals are the most important elements. What follows is one possible structure to address those goals.

THE CONSORTIUM OF UNIVERSITY PARTNERS

If I were pulling together a consortium of partners, I would want to involve a handful of key universities from each of the world's major coastal regions. I don't know what the optimum number is, but from my experience with operational consortia, I would guess it is more than five and less than a dozen. While the consortium might want to involve individual scholars or research groups from other institutions as affiliates in the region—both academic and nonacademic—prob-

ably each region should have one principal member. I suspect that there should be some balance among the so-called developed and developing countries.

The complex nature of this enterprise, and the very uneven distribution of the world's material resources, suggest to me that a single institution—initially, for the sake of argument, The University of Rhode Island (URI)—should take responsibility for coordinating the partnership activities. The institution at the hub, a responsibility which might rotate on some long-term basis, will have special duties in the areas of curriculum, outreach, fund raising, and overall program coordination.

1. Hub Institution's Role

- Take prime responsibility for coordinating theoretical and intellectual development
- Act as a center and coordinate outreach activities
- Coordinate curriculum with the partners or affiliates
- Assume primary responsibility for seeking international activity funding
- Host international adjunct faculty
- Coordinate publication programs

2. Partner Institutions' Roles

- Coordinate field work in that region
- Provide curriculum incorporating field work
- Nominate international adjunct faculty
- Take prime responsibility for seeking regional activity funding
- Host regional events
- Coordinate regional publication programs

3. Affiliate Faculty Roles

- Participate in specific projects
- Teach or team-teach in specific contexts
- Coordinate specific publication projects

THE CURRICULUM—MASTER'S DEGREE IN INTEGRATED COASTAL MANAGEMENT

The consortium should probably concentrate on offering a single degree, a master's degree in Integrated Coastal Management (ICM). For some people, the degree might be their first post-baccalaureate experience, but for many it will complement master's or doctoral degrees in other fields. Ideally, the degree would be offered jointly by the hub institution and the partner institutions where the field work is undertaken. This degree should combine theory and practice, "pure research" and applied studies, with most of the applications involving fieldwork.

The consortium might also offer a component, a minor, or a thematic emphasis in a variety of Ph.D. programs in fields such as oceanography, management, business, engineering, or anthropology. The Ph.D. degree might be offered by any institution within the consortium.

Organization of Curriculum

- Core theoretical curriculum at hub institution
- Field work/practica at partnership sites
- Field work-based curriculum at partnership sites
- Final integrating exercise (field work + theory → formal packaging and dissemination)

Potential Sources of Faculty

- Faculty of hub institution and partner institutions (At URI: Arts and Sciences, science departments; Marine Affairs; Resource Development, the Graduate School of Oceanography; International Adjuncts)
- Government agencies
- NGOs

INTERNATIONAL ADJUNCT PROGRAM

Ongoing intellectual collaboration is essential to the long-term success of these efforts. One way to structure this collaboration is to incorporate faculty from the partner institutions and other institutions, as international adjuncts (IA) at the hub institution. Ideally an IA should be a leading figure in field(s) related to coastal management. They might occupy a fractional faculty appointment (.25 or .33 full-time equivalent) at the hub institution, and might be tenurable to that fraction. Their involvement at the hub university might be scheduled around their nonteaching times at their home institutions. Similarly, faculty from the hub might hold short- or long-term IA appointments at partnership institutions. The IAs' long-term relationship with both the hub and partner institutions should help facilitate curriculum development, funding opportunities, field work placements, and joint publications.

Duties of International Adjuncts

- Teach annual course(s) at hub or partner institutions
- Direct or participate in projects/theses
- Participate in regional/global conferences
- Take part in efforts to secure external funding
- Feature their consortial affiliation on all publications and activities

RESEARCH AND DISSEMINATION

One of the prime goals of the consortium must be to advance research in areas affecting ICM, both in the scientific disciplines and in the applications of scientific knowledge. Presumably, "pure" research will continue to flow best from individual researchers and research teams around the world. While this consortium may choose to undertake "pure" research projects from time to time, as a consortium, its potential contributions are probably more in the area of applied research. To this end, practica and fieldwork at all levels, both in connection with the master's program, and in other

projects with government agencies and NGOs, should be central to the consortium's efforts.

As important as the investigations themselves are, the results of these efforts must be disseminated through conferences, workshops, training programs, and publications. Establishing an identity for the consortium through regular dissemination of activities and a consistently formatted publication series is crucial to attract and sustain support for the consortium's efforts.

Here is a few of the many possible models for education of the ICM community through collaboration on and dissemination of research.

Recurring Non-degree Programs and Continuing Education

- Certificate programs (for practicing coastal managers) in bringing science to bear on management issues bringing management to bear on scientific issues
- Certificate programs (for teachers at various levels) on developing curricula on ecological issues
- Short courses for managers to develop skills such as accounting; environmental accounting; special area management; or working with governing boards
- Short courses on focused issues such as management of coastal erosion; management of water quality; and resolution of use conflicts

Conferences

- Periodic, global, high-level conferences on a major global issue for major scientists and/or policy makers
- Periodic regional conferences focused on the results of fieldwork and practica
- Sporadic topic-focused conferences for policy makers

Publication Series

- Annual conference publication series
- International journal focusing on integrated coastal management issues: open submissions, refereed
- Regional publication series of fieldwork and practica results
 - Published in the language(s) of the region where the work is done; abstracts in English or other major international languages for regional libraries
 - Annual compilation and publication of the abstracts for international libraries
 - Annual reprinting of the most significant work printed in an annual international volume
- Ongoing discussion groups, problem-solving groups, and bulletin boards via communications media such as the Internet

THE CHANGING NATURE OF EDUCATING COASTAL MANAGERS—NEW PARADIGMS, TECHNOLOGY, AND APPROACHES

ROUNDTABLE DISCUSSION

MODERATOR: J. Wiggin

RAPPORTEUR: Chou Loke Ming

DISCUSSION QUESTIONS

- What are the implications of a changing ICM paradigm?
- What emerging technologies can help enhance dissemination (virtual universities)?
- What is the role of distance learning and can it be global in reach?
- How can training programs be linked to attaining educational degrees through accreditation and continuing education?
- How is technical assistance linked to capacity building?
- How can we make the process more cost effective?

RAPPORTEUR'S REPORT

There was general agreement among the group that new technology and approaches (such as distance learning, electronic communication, Geographic Information Systems) are important to enhance coastal management education processes. This technology helps compress the time it takes to learn by disseminating large amounts of information widely, rapidly, and at relatively low cost. Preparation of training materials can be efficiently processed with new technology.

While it is agreed that technology can enhance communication and content delivery, there are several other important considerations:

- Not all countries have the technology and not all universities are prepared to receive new technology. These universities need support to develop the infrastructure that will support the technology.
- In developing institutional capacity for new technology, the major concern is that universities should consider technology relevant to their needs

and not as a way to raise prestige. More important is what technology delivers rather than possession of the technology itself.

- Where support is provided to transfer technology to recipient universities, careful planning is crucial to ensure that the technology is relevant and applicable. Thought needs to be given to:
 - How prepared the university is to receive the technology
 - Whether the institution can sustain the technology
 - How effective the technology is in delivering content to coastal managers and users
- In deciding the selection of new technology, universities must consider the groups they are targeting. Community groups may not possess the necessary facilities to receive information transmitted by technology.
- In some countries, infrastructure for the technology is available, but the expertise to support and maintain the technology is lacking.
- In selecting the type of technology, it is necessary to relate to constantly changing innovations and improvements.

While it is difficult in some universities or countries to receive new technology, there is consensus that support be given to provide the technology when the opportunity arises. This will enable universities to maintain contact with other universities for efficient information sharing and networking.

When providing a university with new technology, the long-term training and educational needs must be considered so that the full benefits of the technology can be derived. Important lessons can be learned from

past and on-going projects (both successful and unsuccessful) that were heavily dependent on technology transfer.

In the next 10 to 15 years, more short training courses and master's degree courses will be needed. These are likely to be scaled down as increasing numbers of coastal users and managers receive training. At the same time, universities can also enhance training capacity by entering into arrangements with one another to involve academic staff in exchange visits, internships, and workshops.

Regardless of the current technical capability, universities should promote ICM training to address the high demand for such information, using whatever resources are available.

The importance of training content was emphasized repeatedly. Content must be designed to teach coastal managers to grapple with people-related problems, to resolve conflicts, and to negotiate effectively at different levels with various groups of coastal users and planners. Translating content into different languages is necessary for wide dissemination. Content meant for wide dissemination must be sensitive to, and compliant with, cultural and social differences in different countries.

RECOMMENDATIONS FOR BUILDING UNIVERSITY CAPACITY IN ICM— PROGRAM MODELS AND CURRICULUM ISSUES

MODERATOR: Robert Miller

RAPPORTEUR: Mark DeMoranville

DISCUSSION QUESTIONS

- What are the strengths and limitations of an interdisciplinary curriculum?
- Is there a need for firm grounding in a specific discipline?
- How important is it to develop interdisciplinary/broad-view thinkers?
- What lessons can be drawn from other fields and applied to ICM curriculum?
- Is there a core curriculum?
- What are the merits of interdepartmental versus interdisciplinary programs?
- What are the pros and cons of creating new programs versus grafting onto existing programs?
- What are the advantages and disadvantages of regional versus national programs?
- What is the best educational approach (adult/experiential learning, case method)?
- What is the duration and types or levels of programs?
- What are the prerequisites?

RAPPORTEUR'S REPORT

The group recognized that there is no single right way to educate coastal managers. Many approaches and strategies may be appropriate depending on the local context and needs. The following outputs generated by the group are intended to serve as a framework and provide guidance to those who are developing educational programs in coastal management.

A Framework Curriculum for Coastal Management

Specialists: The first question the group addressed was: Is there a core curriculum for the coastal management specialist? The group consensus was that there should be a minimal framework of knowledge and skills which a coastal management specialist should have, regardless of region, nation, or local context.

There was much discussion concerning the difference in the curriculum required for a technical specialist as opposed to a coastal management specialist. Essentially, the technical specialist focuses on a traditional discipline and degree program, such as engineering, and may augment this traditional core with additional courses in coastal management, particularly in theory and principles. The coastal management specialist needs to have a broad range of knowledge and skills from a variety of disciplines to be effective. The specialist should gain a speciality in a traditional discipline or field, but the emphasis should be on broad-based learning and understanding theory, methods, and ICM tools. Building a specialization in a traditional discipline may be useful as a graduate could market himself as a coastal manager or a natural resources manager, planner, fisheries manager, or protected area manager. The coastal management specialist is not superhuman with specialized expertise in multiple disciplines. A minimum core of knowledge in various disciplines is needed to be able to understand, manage, coordinate, and communicate effectively with technical specialists.

While many coastal management jobs require a master's degree, a bachelor's degree may be appropriate, not only in terms of types of positions, but in terms of local context. If a position in coastal management needs to be filled, and the pool of available candidates have no more than a bachelor's degrees, then a bachelor's level education may be all that is needed.

Considerations in Creating a Coastal

Management Educational Program: A concern expressed by some individuals was whether a coastal management education program should be named as such. In some contexts, there may be no jobs with the title of coastal manager for people who get this degree. However, the experience of established degree programs is that when a new program is created, it may need to intensively market its graduates in the initial years of existence. Typically, as a program becomes established and develops a track record of graduates, it can become recognized under the name of Coastal Management. It also has been the experience of established programs that while jobs may not exist under the name of Coastal Manager or Marine Affairs, people with this degree will be hired to fill a number of related positions because of the knowledge and skills their program is known to provide to its graduates.

University program developers should determine the need for a new program in terms of the job market. (Is there a growing demand for coastal managers, and if so, how large and for what specific types of expertise?) Another approach, however, is to take the courageous step of initiating a program based on the realization that the natural resource base is being depleted and user conflicts are increasing. This indicates that change is needed and education should reflect that. In other words, some agencies may not be aware of their needs, and universities can be proactive in their approach to education. By producing graduates who view themselves as coastal managers, universities can develop the human resource engines and catalysts that governments need in order to create coastal management programs.

Conducting needs assessment prior to designing an educational program can help to determine the kinds and numbers of jobs which would be available to graduates. For instance, are positions research or field-oriented, and what are the implications for a certain program design?

Internships or practicums should be considered an integral part of a degree program. Internships should serve not only to give students a base of professional experience, but also to provide opportunities to hone methodologies, skills, and applications of tools provided through academic coursework.

It may be practical for a university to simply create new courses within a preexisting program. For example, a program in natural resources management may offer a similar set of courses which provide coastal managers with the framework of theory, methods, and skills. Hence, if courses specific to coastal management were added to the curriculum or offered as a specialized suite of electives, the natural resources management degree could serve the same purpose as a stand-alone coastal management degree program. At many universities, it may be difficult to get a new program approved. New degree programs

cost money to develop, and the question of distribution of financial resources may become an issue. If new program development diverts scarce resources from preexisting programs, there are bound to be serious conflicts. Politically, it may be more feasible to graft onto an existing program rather than attempting to create a new degree program in and of itself.

Regional versus National Educational Program

Models: The size of a country, its population, and the length of its coastline may all play a role in whether or not new educational program development is appropriate. Large countries may have a need for several university programs. Mexico is an example because of its size, population, and long coastline. Smaller countries, such as Ecuador, may not be able to justify development of a single program. It may be better to develop a regional program, in this case, or integrate ICM curricula into existing degree specializations. At certain institutions, because of the risks inherent in starting a new program, it may make more sense to start small, with one or two courses, and over a period of years, if necessary, build up to a full curriculum that is sufficient to grant a degree or establish a new program.

There are two basic models for developing a program within an individual institution: an interdepartmental or floating program, and a separate program within one department. A floating program is not attached to any traditional academic department. The degree is conferred by a program which has a coordinator. Students would have the option of selecting courses from various disciplines and departments to fulfill the requirements of the program. Within this program, students would choose a specialty and take a large number of courses.

A separate departmental program is a more traditional structure, wherein students are granted a degree within a specific department, and are given the option of taking a number of courses to provide the interdisciplinary perspective from other disciplines and departments. The University of Massachusetts-Boston Environmental Studies Program is an example of the departmental program model. The departmental program model, however, needs to allow the student flexibility in his or her curriculum selection depending on the varying entry level backgrounds and eventual career goals of the student. If flexible, this type of program can essentially serve the same purpose as an interdepartmental or floating program in offering a flexible and comprehensive interdisciplinary curriculum.

A regional program would include several universities. Curriculum could be developed jointly and taught among the partner institutions. Initially, there should be a central "headquarters" university which would be

the degree-granting institution. Degrees could be offered jointly, however. This institution would have to be fully accredited. One idea was to consider a regional program as a transitional program. It could be operated for a period of 5 to 10 years with an explicit goal of building local capacity at various national or local universities. As national and local educational institutions develop capacity and establish educational programs, the regional program would phased out.

For a regional program, a mutually beneficial relationship among partner universities could include arrangements for joint appointments. Faculty could teach courses at other universities. This could help with capacity building at the smaller institutions involved in the regional initiative. When partnership programs are developed, it is important to insure that they are beneficial to all universities involved. Formal arrangements should be made and activities carefully planned. This will avoid confusion and help to build trust between the participating institutions. Lessons learned from previous attempts to establish regional programs have shown that, although they may include a strong curriculum and draw from a talented faculty, if the program relies on external funding and the funding ends, the program may end despite continuing demand. The funding may run out before the program becomes self-sustaining. The preferable model for regional program development is one that originates organically, through consensus among several national and academic institutions in the region, rather than through an externally driven and funded arrangement. Donors may be more willing to support an organic model rather than an externally proposed model. If a regional program is created and is successful in attracting students from other nations, infrastructure considerations need to be taken into account. At many universities, the majority of students commute and residential facilities may be needed for a regional student body.

One point that was raised was that uncoordinated efforts can lead to many programs springing up in a very short period of time. This could pose a danger in that a limited group of talented faculty could be spread too thin. Rather than having one strong program, there may be several weak programs. However, several programs in coastal management may be needed and can stimulate competition.

Even if there is a perceived need for a coastal management degree program at a national level in one country (for example, due to perceived job growth in the coastal management field), governments of neighboring countries may not give coastal management high priority in the foreseeable future. Consensus and support needs to be sought at high levels within government as well as within the participating academic

institutions for the need to create a regional program among nations and universities.

Types of Degree Programs and Student Prerequisites:

Two types of students will be in these programs: Recent college graduates or mid-career professionals returning to school for an academic degree. In Universidad Autonoma de Baja California Sur, for example, many professionals from diverse fields (such as engineering) are taking night courses toward a degree in coastal management. At Silliman University, many older students are enrolled part-time for degrees in marine studies.

Table 1 lists the typical positions and job functions graduates of a degree program or those who have specialized in coastal management might expect to find after graduating. The group felt that the largest demand in most regions and countries is at the master's level. A master's degree in coastal management can be viewed more as a professional degree such as those offered in public administration and business administration. However, in some nations and areas, a bachelor's degree may be sufficient. Doctoral programs were considered the lowest priority. It was also pointed out that there is a great need for in-service or certificate educational programs for technical specialists working on coastal management initiatives. Such individuals may or may not have existing degrees and, since they are employed, may not be able to attend traditional degree programs. In such circumstances, a night school or distance learning program may be a more appropriate way to deliver a program.

While the number of jobs available to graduates with Ph.D.s are not considered substantial at the moment (primarily university professorships and high-level program administrators), doctoral programs may need to be created to help foster the development of a new discipline of coastal management. When the discipline of ecology was emerging many years ago, many academics viewed it from an interdisciplinary/holistic approach and felt that doctoral programs were not needed. Initial graduates had difficulty getting their research published. But over time, a body of research and theory developed which is now widely accepted, and many doctoral programs have subsequently been established. Coastal management as a discipline may be at a similar early stage of development, as ecology and oceanography once were. It may take a pioneering spirit to move the paradigm forward, advancing the body of knowledge and theory to the point where coastal management can be accepted in its own right as a discipline.

TABLE 1: POTENTIAL JOBS AND POSITION TITLES FOR GRADUATES OF COASTAL MANAGEMENT DEGREE PROGRAMS

Bachelor's	Master's	Doctoral
Fisheries Development Planner	Policy Design Specialist	Professor
Coastal Engineer	Coastal Management Planner	Senior Program Administrator
Permit Review Officer	Municipal/Land Use Planner	
Public Education Specialist	Economist	
Tourism Officer	Interagency Coordinator	
Recreation Officer	Lawyer	
Enforcement Officer	City/Urban Planner	
Field Biologist	Policy Analyst	
Field Engineer	EIA Specialist	
	Program Administrator (Environmental, Natural Resource Agencies)	
	Program Officer (Donor Programs)	
	Conflict Management Specialist	
	Project Development Officer	
	Project Manager	
	Enforcement Supervisor	
	Habitat Specialist	
	SAM/Protected Area Specialist	
	Public Safety/Disaster Planning Specialist	
	Public Health Specialist	
	Port Manager/Harbormaster	

For some of the natural sciences and economics courses in an interdisciplinary master's program, some prerequisites may be required. At a bachelor's level, typical general education requirements are necessary. If the goal of an interdisciplinary program is to provide a base of knowledge in a broad range of disciplines, it may be possible to develop special courses tailored to the needs of these students, encompassing the knowledge, skills, and attitudes that they need as coastal management specialists. A grounding in a specialty is important. This should be obtained at the bachelor's level for those entering a coastal management master's program. An interdisciplinary master's program should also allow the student the option of concentrating on a specialty within the framework of this program.

A Framework Curriculum: Table 2 illustrates the five areas key to a master's degree in coastal management. They are Theory and Knowledge; Tools; Methods and Skills; Practicums; and Ethics. Ethics was considered to be an important area because appropriate attitudes and modes of behavior must be instilled throughout the curriculum.

TABLE 2: A FRAMEWORK CURRICULUM FOR A DEGREE PROGRAM IN COASTAL MANAGEMENT

Curriculum Area	Content
Theory and Knowledge	management ecology of natural resources social/political/economic issues policy development legal frameworks
Tools (used to apply a method)	geographic information systems remote sensing global positioning systems statistics
Methods/Skills	planning and evaluation resource and ecological assessment and valuation communication benefit/cost analysis leadership
Practicum	cultural literacy application of methods and theory in an actual job setting
Attitudes	ethics of public and community service ecological ethics

RECOMMENDATIONS FOR BUILDING UNIVERSITY CAPACITY IN ICM: HUMAN RESOURCES ISSUES, INSTITUTIONAL STRENGTHENING ISSUES, CONSULTATIVE ARRANGEMENTS, AND PARTNERSHIPS

MODERATOR: J. Stanley Cobb

RAPPORTEUR: Stefano Belfiore

DISCUSSION QUESTIONS

Human Resource Issues:

- What are the needs for faculty and materials development?
- What are the relative merits of materials-based versus faculty/trainer-based development approaches?
- What is the appropriate mix of knowledge, skills, and experience needed by teachers/trainers?
- What are the best strategies for faculty and trainer development?

Institutional Strengthening Issues:

- What are the preconditions for universities to establish ICM infrastructure issues?
- What are the implications of the stages of university development and level of ICM program development within a country?

Consultative Arrangements and Partnerships:

- What are some suggested relationships among universities—should they collaborate or compete?
- What contributions can NGOs, government, and the private sector make in teaching, research, and service roles?

RAPPORTEUR'S REPORT

The discussion was initially conducted informally to set the stage for a free exchange of ideas. It then proceeded with a more formal analysis of the topics. Some core issues emerged relating to the elements that initiate a process that leads to establishment of an educational program in coastal management. The availability of funding was recognized as one of the most important components of the initiation process. Particularly in developing countries, university funding is normally provided by the government, although some examples of private institutions can be found. The perception of

a growing need for educational programs in ICM has also been considered, even though a clear determination of the demand - both in qualitative and quantitative terms - is not easy. Urgent problems or conflicts that need to be resolved in the coastal zone (e.g., beach erosion) seem to play a significant role in prompting institutions to establish educational programs in ICM-building upon current ICM courses.

A typical initiating process may go through the following phases:

- Perception of a critical coastal zone management issue
- Establishment of a temporary interdisciplinary research team built upon a leading group in a specialized and qualified department
- Transformation of the temporary team into a permanent structure
- Establishment of an educational program in ICM

Other elements identified as critical in order to initiate human resource development in ICM encompass:

- An ongoing process in ICM
- The existence of qualified centers of expertise in disciplines contributing to ICM
- The availability of funding
- The possibility to draw upon experienced and qualified faculty and staff
- The availability of technical equipment
- A demand for graduates in ICM
- The willingness to undertake interdisciplinary programs
- A vision or philosophy in ICM
- A political commitment to ICM and appropriate institutional arrangements

Other important components to be considered include:

- The role of technology in creating worldwide homogenization
- The willingness to overcome the traditional organization of universities in separate departments
- Promoting the knowledge and appreciation of nature at a pre-university level
- The role of research groups in gathering people from different disciplines and creating an interdisciplinary research environment
- The importance of donors to ensure the sustainability of the program

The analysis of the discussion topics was conducted on the assumption that a context for the establishment of an educational program in ICM had been identified. This context implies that:

- There is demand for ICM graduates
- There are not enough ICM programs in the country or the region
- An institution is willing to establish an educational program in ICM
- A consensus has been built with the government on the need for such a program

Consensus was reached about the preliminary steps to undertake in order to establish the program. The first step would consist of a diagnosis or capability statement of the university including the existing departments, faculty, programs, infrastructure, and funding. A second step would be devoted to determining strengths and weaknesses. A third and final step would involve identifying externalities such as market and competitors, both in the country and the region. The discussion then turned to the analysis of the specific issues related to the three major discussion topics.

Human Resource Issues: For faculty, there is a major need to develop capability to match the program curriculum. The mix of knowledge, skills, and experience needed by the teachers was not addressed, but it was agreed that if there is not an appropriate mix within the faculty, the first strategy should be to develop the expertise needed through in-service training, and then proceed with recruiting other teachers who have the required skills and knowledge, either from within the university or from other institutions. A reward system could be established to provide incentives, both to students and faculty, to promote involvement in the program. Research opportunities and the possibility of interdisciplinary work should be appealing. Study and research resources such as books, training materials, and case studies also appear to play a role in supporting a program.

Institutional Strengthening Issues: The discussion particularly focused on the need for infrastructure,

such as equipment (field and presentation equipment, communication infrastructure, audiovisuals, transportation means, data management software), facilities (libraries, offices, classrooms, laboratories), and supporting staff. The importance of administrative support services was also recognized (maintenance facilities, secretarial, and financial services) along with the capability to hold workshops and other events. It was agreed that if infrastructure was not available, priorities should be set and an effort made to share resources with other university departments.

Consultative Arrangements: A positive attitude towards cooperation was considered important. Linkages should be sought with other universities on the basis of personal contacts. Collaborative projects should be established to get the most benefit from funding sources. Working groups, faculty, staff, and student exchanges should also be promoted. Cooperation should not be limited to universities, and linkages should be established with the government. Student internships in government agencies and course lectures by professional coastal managers from the government are two important areas of cooperation in the educational program. Cooperation with NGOs would be very useful, especially in an attempt to link training and public education with formal education. Cooperation with the private sector was also considered very important, particularly in reference to internships and the availability of training and research facilities. Research and management contracts were also recognized as useful instruments. An effort should be made to ease the university's constraints on this type of collaboration.

Networks and Partnerships: These are considered fundamental in strengthening communication with international organizations, promoting harmony, and avoiding duplication. Cooperation could be sought with:

- International organizations and agencies (e.g., UN systems, OECD), particularly for research funding
- Education networks (e.g., IOI, TRAIN-SEA-COAST, NETTLAP, IOC)
- Information exchange networks (e.g., NETTLAP, AFSSRN, CRN, TRAIN-SEA-COAST, IOI) and others

The importance of strengthening and coordinating such networks, or to establish new ones, was generally acknowledged. Recommendations were made to:

- Establish joint curricula within the context of such networks
- Identify and establish appropriate linkages with existing networks
- Explore the possibility to establish a global network of ICM universities

RECOMMENDATIONS FOR BUILDING UNIVERSITY CAPACITY IN ICM

PLENARY DISCUSSION

MODERATOR: M.A.K. Ngoili

RAPPORTEUR: Stella Maris Vallejo

RAPPORTEUR'S REPORT

The first part of the discussion centered on strategies for program models, curriculum, and human resources development. In this respect, in-service training was highlighted as an integral part of an educational program. In many countries, this activity is conducted outside the university, but it was recommended to be promoted within the university in line with continuing education.

Internships were also discussed as an important component of the curriculum with a potential duration of approximately 6 to 12 months. Furthermore, a parallel comparison was made between other professions (e.g., medicine, engineering) where internships play a crucial role in gaining practical work experience. The Marine Affairs Program of URI places increasing importance on internships (allowing up to 12 credits out of a total of 45). As to the modalities for acquiring practical work experience, internships within an established coastal management program (e.g., the case of Ecuador) can provide an opportunity for students to work side-by-side with practitioners. In other countries, such as Sri Lanka, the Coast Conservation Department is the government agency with responsibility for ICM and provides the infrastructure for graduates to work as field officers and to be paid as interns on a contractual basis. The discussion also emphasized the need for the internship to be a vehicle that provides a rigorous process to learn lessons.

Some participants voiced their concern with respect to the name given to the profession and program of study. Some pointed out that "coastal management" does not have, as yet, enough leverage in the labor market and, therefore, other names such as "resource management" are used because they apply more easily to the demands for graduates. It was also pointed out that the political awareness created by Chapter 17 of Agenda 21 ensures a world-wide recognition of ICM as

a discipline and field. Nevertheless, there is a need to have a great degree of flexibility in different countries and cultures.

As for the curriculum, the discussion centered on the knowledge, skills, and attitudes necessary to produce ICM specialists and/or ICM "generalists/super-managers." In this respect, various possibilities were discussed. First, there is a need to reorient specialists to respond to ICM needs. One alternative suggested was to provide sectoral specialists with similar knowledge as provided to generalists (core curriculum, including theory and knowledge, tools, instruments, and practical experience), but with a different degree of depth. Others suggested that in-service training may be a vehicle to attain this goal. Another participant suggested the need for the generalist to be familiar with various technical/sectoral aspects in order to be able to manage a team of specialists and to be able to cut across different disciplines.

The second part of the discussion centered on institutional strengthening, consultative arrangements, and partnerships with special attention given to the role of regional programs. Advantages and disadvantages were discussed. A positive example was illustrated by the East African educational institutions in Tanzania, Kenya, and Uganda which, although not specifically related to coastal management studies, showed how a regional cooperation strategy worked. The universities are bound by an agreement and a quota system that allows students from three countries to take courses at other universities. For students outside the host university, the level of financing for tuition and stipends is equivalent to local students and sufficient to achieve their education. The disadvantages discussed were related to the quota system applied by some donors in funding, which appears to be related to specific projects such as coral reefs. Furthermore, constraints were identified related to the continuity of funding for

universities and a regional program.

The advantages of networking (at the global, regional, or local level) were highlighted, particularly in terms of benefits derived from combining the relative strengths of each participating institution. In the case of the Philippines, a consortium of universities offers a single degree program with a common curriculum, whereby students can move between campuses to obtain the coursework required. The benefits of networking and partnerships between universities, NGOs, and the government were also highlighted with examples of Ecuador and the Philippines, where the sharing of equipment and facilities among the various parties is an attempt to address limited and often declining funds and resources available to individual institutions. A word of caution was given about formalizing arrangements between participating institutions in order to avoid jeopardizing the continuity of projects.

SECTION 6
APPENDICES

Appendix A: Workshop Agenda	163
Appendix B: Workshop Participants	167

APPENDIX A: AGENDA-INTERNATIONAL WORKSHOP ON EDUCATING COASTAL MANAGERS

WHISPERING PINES CONFERENCE CENTER
ALTON JONES CAMPUS
UNIVERSITY OF RHODE ISLAND
MARCH 4-10, 1995

Saturday, March 4

Participants arrive Providence

(T.F. Green Airport)

Workshop Secretariat provides transportation from airport to Alton Jones Campus
Participants register (Sycamore Lodge)

7 PM *Dinner*
(Whispering Pines Lodge, dining room)

Sunday, March 5

8 AM *Breakfast*
(Whispering Pines Lodge, dining room)

9 AM **Opening** (R. Miller, Dean, College of Resource Development)
Welcome (M. Beverly Swan, Provost and Vice President for Academic Affairs)
Introductions, Organizational and Administrative Matters (B. Crawford)
Workshop Agenda and Expected Outputs (J.S. Cobb)

9:30 AM **Address** (S. Olsen)
Coastal Management in the 21st Century: The Knowledge and Skills Needed of Coastal Managers

10 AM *Break*
Training and Educational Needs of ICM Professionals

10:15 AM **Small Group Regional Caucuses: Analysis of Demand**
(B. Crawford-facilitator) (Groups: Asia, Pacific, and East Africa; Latin America; Mediterranean and Black Sea; North America and Western Europe)
Presentation of a case study paper (10 min.) for each region and discussion:

(Case Studies: Coello-Ecuador, Munoz-Philippines, Pavasovic-Mediterranean and Black Sea, Wiggin-United States)

Analysis of the knowledge, skills, and attitudes that make successful coastal managers.

Current types of positions and in what type of institution (CRM agencies and related-sectoral units).

Changes in the quantity and type of jobs over the next decade.

Assessment of the demand for coastal managers both quantitatively and qualitatively in the various regions of the world.

How do needs vary among nations in the region?

(A rapporteur will be designated for each regional group.)

Noon *Lunch*
(Whispering Pines Lodge, dining room)

1 PM Small groups continue work

2 PM **Plenary Reports from Regional Caucuses**
(L. Hale-Moderator, K. Brown-Rapporteur)

3 PM *Break*

3:15 PM **Moderated Plenary Discussion**
How do needs vary at different stages of development in a coastal management program?
Who are the clients of ICM education and training programs?
Who are the participants of ICM education and training programs?
What are the critical components, given the needs, of an ideal ICM curriculum?

5 PM **Rapporteur's Report**
Summary and synthesis of status and trends
What are the commonalties and differences among regions and the implications?

6 PM *Get acquainted socials*
(Whispering Pines Lodge, living room) (refreshments and hors d'oeuvres)

7 PM *Welcome Dinner*
(Whispering Pines Lodge, dining room)

Evening	Rapporteurs for each regional group work on regional report Plenary rapporteur works on summary of plenary discussions Workshop organizing committee meets	1 PM	Panel: Experience in Capacity Building-Case Studies and Lessons Learned (Panelists: E. Gomez , S. Boromthananarat, M. Leinen, K. Brown) (S. Cobb- Moderator, S. Coello- Rapporteur)
Current Programs, Curricula, and Approaches		2 PM	Moderated Discussion What are the implications of this stage of institutional and national development? What are the regional differences? How do we assess institutional needs and capability?
Monday, March 6		3 PM	<i>Break</i>
8:45 AM	Panel: Coastal Management Training and Degree Programs: Status and Trends (Panelists: R. South, Chou L.M., N. West, J.L. Ferman, E. Ozhan) (E. Ferrer- Moderator, B. Crawford- Rapporteur) Existing courses and curricula for training and degree education in ICM Regional differences in offerings Trends: planned and proposed programs over the next five years Financing issues	3:15 PM	Rapporteur's Report
10 AM	<i>Break</i>	3:30 PM	Address (Max Aguero) Emerging Methodological Issues in Coastal Management in Developing Countries
10:15 AM	Moderated Discussion Content: How well do current programs address the needed skills and knowledge? To what extent should demand drive content of curricula? What are the priorities for course/curriculum/program development? Educational Approaches: What should be the balance between academic courses and practicums/internships/thesis? What are the various merits of graduate, professional, and undergraduate degree programs? Advantages and disadvantages of educational methods/approaches (adult educational methods, on-the-job training, internships, exchanges, and distance learning). How do training and educational programs differ (content, methods, clients, participants), and what is the balance between the two?	Evening	Optional/Additional Slide Shows, Demonstrations, or Presentations by Participants
11:40 AM	Rapporteur's Report	Strategies for Building University Capacity	
Noon	<i>Lunch</i>	Tuesday, March 7	
		8:45 AM	Roundtable Discussion: The Changing Nature of Educating Coastal Managers—New Paradigms, Technology, and Approaches (J. Wiggin-Moderator, Chou Loke Ming- Rapporteur) What are the implications of a changing ICM paradigm? What emerging technologies can help enhance dissemination (virtual universities)? What is the role of distance learning and can it be global in reach? How can training programs be linked to attainment of educational degrees (accreditation, continuing education)? How is technical assistance linked to capacity building? How can we make the process more cost effective?
		10 AM	<i>Break</i>
		10:15 AM	Roundtable Discussion Continued

11 AM	Rapporteur's Report	Consultative Arrangements and Partnerships
11:20 AM	Address (D. Gitlitz, URI) An Integrated Program for Educating and Sustaining Coastal Resource Managers	Relationships among universities—collaborate or compete?
Noon	<i>Lunch</i>	Contributions and roles of NGOs, government, private sector in-service, teaching, and research.
1 PM	Address (S. Cobb) Building Capacity at Universities: Lessons Learned	6 PM <i>Dinner</i> (7 PM on all other evenings)
1:30 PM	Small Groups: Recommendations for Building University Capacity in ICM (B. Crawford-Facilitator)	Evening Small Groups (continue discussions and group rapporteur's work on written reports.)
	Group 1: Program Models and Curriculum Issues What are the strengths and limitations of an interdisciplinary curriculum? Is there a need for firm grounding in a specific discipline? How important is it to develop interdisciplinary/broad view thinkers? What lessons can be drawn from other fields and applied to ICM curriculum? Is there a "core" curriculum? Discussion about interdepartmental versus interdisciplinary programs/new programs versus grafting onto existing programs; regional versus national programs; educational approaches (adult and experiential learning, case methods); duration and types or levels of programs; prerequisites.	Wednesday, March 8
	Group 2: Human Resource Issues, Institutional Strengthening Issues, and Consultative Arrangements and Partnerships Human Resource Issues Needs for faculty and materials development Materials-based versus faculty/trainer-based development approaches The mix of knowledge, skills, and experience needed by teachers/trainers Strategies for faculty/trainer development Institutional Strengthening Issues Preconditions for universities to establish ICM programs infrastructure issues Implications of university development and the level of ICM program development within a country	8:45 AM Group Reports on Recommendations and Moderated Discussions (M.A.K. Ngoili-Moderator, S. Vallejo-Rapporteur) Program models and curriculum Human resource development Institutional strengthening Consultative arrangements and partnerships
		10 AM <i>Break</i>
		10:15 AM Group Reports continued
		11:30 AM Rapporteur's Report
		Noon <i>Lunch</i>
		1:15 PM Panel: Networks and Partnerships (Panelists: S. Vallejo-TRAIN-SEA-COAST, M. Bandara-NETTLAP, E. Ozhan-MEDCOAST, M. Wood-IOI) (N. Calumpong-Moderator, D. Sadacharan- Rapporteur)
		2:15 PM Moderated Discussions How can a network benefit practitioners and how can they contribute to it? What can universities get from and give to a network? How can universities benefit and what can they contribute to non-university members? Sharing and development of materials and faculty/trainers. Decentralized versus centralized approaches. National versus regional versus international networks.

3:15 PM *Break*

3:30 PM **Rapporteur's Report**

4 PM **Plenary: Synthesis and Discussion of Workshop Recommendations**
(Organizing Committee)
Preparation of an "Alton Jones Declaration"—recommendations for building educational capacity.
Opportunities for Funding Capacity-Building Initiatives

Thursday, March 9

8:45 AM **Presentation by Workshop Participants**
"The Alton Jones Declaration"—A Summary of Workshop Findings and Recommendations for Building Human Capacity for Integrated Coastal Management.

9:30 AM **Panel: Donor Initiatives for Building Human Capacity for Integrated Coastal Management (ICM)**
(Panelists: Twig Johnson-USAID, Marea Hatzios-World Bank, S. Vallejo for Phil Reynolds-UNDP)
(M. Bandara-Moderator, M. Aguerro-Rapporteur)

What is the response to workshop recommendations?

What are donors doing in ICM?

Why are donors so interested in ICM?

What is the donor experience in educational capacity building?

How can the ICM short-term training initiatives of donors be more closely linked to long-term educational capacity building?

How can donor recipients ensure that they get the most out of donor assistance?

10:15 AM *Break*

10:30 AM **Moderated Discussion**

Financing capacity building.

The goals of donors and recipients vis a vis educational capacity building.

Methods of approach, applications, and fund raising.

11:40 AM **Rapporteur's Report**

Noon *Lunch*

1:15 PM **Workshop wrap-up**
(Organizing Committee)
General review of outputs
Discussion of next steps and workshop follow-up
Workshop evaluation

2:15 PM **Workshop closing remarks** (Robert Carothers, President, URI)

3 PM **Local excursions and pack-up**
(JASON Project at GSO-3:45 PM)
Organizing Committee review wrap-up work needed and proceedings production

Evening **Thank-you dinner and farewell party**

Friday, March 10

Morning **Participants check out and leave**
Secretariat packs and departs

APPENDIX B: WORKSHOP PARTICIPANTS

Aguero, Max
Director
Inter-American Centre for Sustainable
Ecosystems Development (ICSSED)
Casilla 27004
Santiago, Chile
Tel.: 56-2-273-2540/273-5577
Fax: 56-2-273-2540

Bandara, Madduma
Vice Chancellor
University of Peradeniya
Kandy,
Sri Lanka
tel/fax: 94-8-88151 - office
Mobile Phone: 94-78-70577
tel/fax: 94-8-88397 - home

Belfiore, Stefano
Secretary - General
International Centre for Coastal & Ocean
Policy Studies
c/o Acquario di Genova
Area Porto Antivo-Ponte Spinola
16126 Genova, Italy
Tel: 39-10-273 4515
Fax: 39-10-2737225

Boromthananarat, Somsak
Director
Coastal Resources Institute (CORIN)
Prince of Songkla University
PO Box 102
Hat Yai, Songkhla, 90112
Thailand
tel.: 66-74-212800
fax: 66-74-212782
Internet: corin@sritrang.psu.ac.th

Brown, Kenneth
Head, Department of Environment
Biology and Horticulture
Director, Institute of Coastal Resources
Management
University of Technology, Sydney
Westbourne Street
Gore Hill NSW 2065
Australia
Tel.: 61-2-330-4042
Fax: 61-2-330-4079
Internet: K.Brown@uts.edu.au

Calumpong, Hilconida
Director
Silliman University Marine Laboratory
Dumaguete City, 6200 Negros Oriental
Philippines
Tel.: 6335-225-2500
Fax: 6335-225-4608
Internet: rdlsuml@durian.usc.edu.ph

Cervantes, Eduardo
Director
Centro de Recursos Costeros
ESPOL-MARITIMA
PO Box 09-01-5863
Guayaquil, Ecuador
Tel.: 593-4-269-454/470
Fax: 593-4-854-629 or 593-4-854-587
Internet: ecervan@espol.edu.ec

Chou Loke Ming
Associate Professor
Zoology Department
National University of Singapore
Lower Kent Ridge Road
Singapore 0511
Tel.: 65-772-2696
Fax: 65-779-6155
Internet: zooclm@nus.sg

Cobb, J. Stanley
Professor
Department of Zoology
University of Rhode Island
Kingston, RI 02881
Tel.: 401-792-2683
Fax: 401-792-4256
Internet: scobb@uriacc.uri.edu

Coello, Segundo
Technical Director
Programa de Manejo de Recursos
Costeros
Edificio del Ministerio de Agricultura
Piso 20, PO Box 09-01-5850
Calles Quito y Padre Solano
Guayaquil, Ecuador
Tel.: 593-4-28-1144/284453
Fax: 593-4-28-50-38

Crawford, Brian
Training Manager
Coastal Resources Center
University of Rhode Island
Kingston, RI 02881
Tel.: 401-792-6224
Fax: 401-792-5436
Internet: crawford@gsosun1.gso.uri.edu

· Demoranville, Mark
· Training Coordinator
· Coastal Resources Center
· Narragansett Bay Campus
· University of Rhode Island
· Narragansett, RI 02882
· Tel.: 401-792-6224
· Fax: 401-792-5436
· Internet: markd@gso.sun1.gso.uri.edu

· Ferman-Almada, Jose Luis
· Jefe del Departamento de Investigacion
· Blvd. Benito Juarez s/n
· Edificio de Investigacion y Posgrado
· Unidad Universitaria
· Mexicali, Baja California Mexico
· Tel.: 52-65-66-36-33
· Fax: 52-65-66-36-33
· Internet: samtam@bahis.ens.uabc.mx

· Ferrer, Elmer
· Associate Professor
· College of Social Work and Community Development
· University of the Philippines
· Diliman, Quezon City
· Philippines
· Tel: 632-98 24 71 to 79 loc. 5443;
· 5278 or (632) 97 24 77
· Fax: 632-97-8438

· Fuller, Elizabeth
· Intern Coordinator/Outreach Specialist
· Coastal Resources Center
· Narragansett Bay Campus
· Narragansett, RI 02882
· Tel.: 401-792-6224
· Fax: 401-792-5436

· Gitlitz, David
· Professor Languages
· Independence Hall
· University of Rhode Island
· Kingston, RI 02881
· Tel.: 401-792-4695
· Internet: nby101@uriacc.uri.edu

· Gomez, Edgardo
· Professor and Director
· Marine Science Institute
· College of Science
· University of the Philippines
· Roces Avenue
· U.P.P.O. Box 1, Diliman
· 1101 Quezon City
· Philippines
· Tel.: 632-922-3959
· or 632-976-061 & 982-471 local 7416
· Fax: 632-924-7678
· Internet: admin@msi.upd.edu.ph

· Hale, Lynne Zeitlin
· Associate Director
· Coastal Resources Center
· Narragansett Bay Campus
· University of Rhode Island
· Narragansett, RI 02882
· Tel.: 401-792-6224
· Fax: 401-792-5436
· Internet: lzahale@gso.sun1.gso.uri.edu

· Hatzios, Marea
· World Bank
· Environment Department
· ENVLW: S-5141
· 1818 H Street NW
· Washington, DC 20433
· Tel.: 202-458-5779
· Fax: 202-477-0568 or 202-477-0565

· Leinen, Margaret
· Vice Provost, Marine Affairs
· Dean, Graduate School of Oceanography
· Narragansett Bay Campus
· University of Rhode Island
· Narragansett, RI 02882
· Tel.: 401-792-6222
· Internet: mleinen@gso.sun1.gso.uri.edu

· Matuszeski, William
· Director
· Chesapeake Bay Program Office
· U.S. Environmental Protection Agency
· 410 Severn Avenue
· Annapolis, MD 21403
· Tel.: 410-267-5700 or (800)YOUR BAY
· Fax: 410-267-5777

· Miller, Robert
 · Dean, College of Resource Development
 · Department of Resource Development
 · University of Rhode Island
 · Kingston, RI 02881
 · Tel.: 401-792-2474
 · Fax: 401-792-4017
 · Internet: bobm@uriacc.uri.edu

· Munoz, Jessica
 · Head, Coastal Resources Management Section
 · Bureau of Fisheries & Aquatic Resources
 · Arcadia Building
 · 860 Quezon Avenue
 · Quezon City
 · Metro Manila 1103
 · Philippines
 · Tel.: 632-96-54-44
 · Fax: 632-922-22-31/632 98 85 17

· Ngoile, M.A.K.
 · Director
 · Institute of Marine Sciences
 · University of Dar es Salaam
 · P.O. Box 668
 · Zanzibar, Tanzania
 · Tel.: 255-54-30741 / 32128
 · Fax: 255-54-33050

· Olsen, Stephen B.
 · Director
 · Coastal Resources Center
 · Narragansett Bay Campus
 · University of Rhode Island
 · Narragansett, RI 02882
 · Tel.: 401-792-6224
 · Fax: 401-792-5436
 · Internet: olsenuri@gsosun1.gso.uri.edu

· Ozhan, Erdal
 · Chairman, MEDCOAST International Committee and
 · Permanent Secretariat
 · Professor of Coastal Engineering Management
 · Middle East Technical University
 · Department of Civil Engineering
 · 06531 Ankara, Turkey
 · Tel.: 90-312-210-1000 ext. 5435-5439
 · Fax: 90-312-210-1412
 · or 90-312-210-1262
 · Internet: ozhan@rorqual.cc.metu.edu.tr

· Pavasovic, Arsen
 · Priority Actions Programme
 · Regional Activities Center
 · UNEP
 · Kraj Sv. Ivana 11
 · 58000 Split, Croatia
 · Tel.: 385-21-43499
 · Fax: 385-21-361677
 · Internet: arsen.pavasovic@public.srce.hr

· Rhodes, Thomas E.
 · U.S. Agency for International Development
 · Global Bureau
 · Environment Center
 · Washington, DC 20523-1812
 · Tel.: 703-875-4320
 · Fax: 703-875-4639
 · Internet: TRhodes@USAID.GOV

· Sadacharan, Dianeetha
 · Coastal Zone Management Centre
 · P.O. Box 20907
 · 2500EX The Hague
 · The Netherlands
 · Tel: 31-70-3114367
 · Fax: 31-70-3114380

· South, G. Robin
 · Director IOI - South Pacific and
 · Professor of Marine Studies
 · Marine Studies Programme
 · The University of the South Pacific
 · P.O. Box 1168
 · Suva
 · Republic of Fiji
 · Tel.: 679-305-446/305 272
 · Fax: 679-305-559/031-490
 · Internet: south_r@usp.ac.fj

· Vallejo, Stella Maris
 · Ocean Affairs/Law of the Sea Officer
 · Coordinator, TRAIN-SEA-COAST Programme
 · Division for Ocean Affairs and the Law
 · of the Sea
 · Office of Legal Affairs
 · United Nations
 · Room DC2-0482
 · New York, NY 10017
 · Tel.: 212-963-3935
 · Fax: 212-963-5847

· Veitayaki, Joeli
 · IOI - South Pacific
 · Marine Studies Programme
 · The University of the South Pacific
 · PO Box 1168
 · Suva
 · Republic of Fiji
 · Tel.: 679-305-446
 · Fax: 679-302-338 or 679-301-305
 · Internet: veitayaki.j@usp.ac.fj

· West, Niels
 · Professor
 · Department of Marine Affairs
 · University of Rhode Island
 · Kingston, RI 02881
 · Tel.: 401-792-4046
 · Fax: 401-792-2156
 · Internet: nielsmaf@uriacc.uri.edu

· Wiggin, Jack
 · Assistant Director
 · Urban Harbors Institute
 · University of Massachusetts, Boston
 · 100 Morrissey Blvd.
 · Boston, MA 02125-3393
 · Tel. 617 287 5570
 · Fax: 617 287 5575
 · Internet: urbharbors@unbston.cc.unb.edu

· Wood, Margaret J.
 · Director
 · International Ocean Institute
 · Dalhousie University
 · 1226 LeMarchant Street
 · Halifax, Nova Scotia
 · Canada B3H 3P7
 · Tel.: 902-494-6623
 · Fax: 902-494-2034
 · Internet: IOIHX@ac.dal.ca